# HP 2392A
# Display Terminal
# User's Manual


HEWLETT
PACKARD

## RADIO FREQUENCY INTERFERENCE STATEMENTS

## FOR THE UNITED STATES

### Federal Communications Commission (FCC)

The US Federal Communications Commission (in 47 CFR 15.818) has specified that the following notice be brought to the attention of the users of this product.

**WARNING**

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits of a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever steps may be required to correct the interference.

## FOR EUROPE

### Verband Deutscher Elektroniker (VDE)

This equipment has been certified to comply with the German standard VDE 0871 level B.

# HP 2392A DISPLAY TERMINAL
# USER's MANUAL

## PUBLICATION HISTORY

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This manual applies to HP 2392A Display Terminals with serial number prefixes from 2420F onwards.

If changes have been made to the terminal since this manual was printed, a yellow "manual updating supplement" defining them is supplied with this manual to explain how to adapt the manual to the modified equipment. The changes will be incorporated in the next revision of the manual.

The part numbers for the national language versions of this user's manual are:

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# TERMS USED IN THIS MANUAL

*The following table explains some of the terms used in this manual (in alphabetical order)*

| TERM | DESCRIPTION |
|---|---|
| ACTIVATE/ DEACTIVATE | Switch ON/OFF a particular terminal function or mode. |
| BLOCK MODE | Applies when the terminal is in Remote Mode. Data typed on the keyboard is stored in the terminal's memory, and is not transmitted to the computer until the **[Enter]** key is pressed. The data is then sent in a block of one line or page(s), as configured. This allows the data to be composed and edited before it is sent to the computer. |
| CHARACTER MODE | Applies when the terminal is in Remote Mode. Data typed on the keyboard is transmitted to the computer one character at a time (i.e. as it is typed). The computer interprets the data transfer as complete (terminated) when the **[Return]** key is pressed. |
| COLUMN | A vertical row of characters on the screen. The columns are numbered from 1 through 80, starting with the first character position on the left side of the screen (see Figure 4-1). |
| CONFIGURATION | The setting of the terminal-to-device data communication parameters, and some terminal operating states (see Section 5). |
| CURRENT COLUMN/ LINE/PAGE | The column/line/page containing the cursor. |
| CURSOR | The blinking underline on the screen that indicates where the next character or space appears when the character is typed on the keyboard or received from the computer. The current line and column position of the cursor is indicated by numbers at the bottom of the screen (see Figure 2-1). |
| DATA | A general term for information; such as words, numbers and codes, or any combination of the three. |
| DATACOMM | Abbreviation for "data communications" (the transfer of data between the terminal and a computer or external device). |
| DATACOMM MODULE | A small optional printed circuit card (installed in port ②), used to provide the connection between the terminal and an external device. |
| DATA TRANSFER | The process of moving (or copying) data from one device to another, such as from the display screen to a printer. |
| DIACRITIC | A mark such as an accent, circumflex or tilde used to modify the phonetic nature of an alphabetic character. Used with the national language keyboards. |
| ECHO | In Character Mode, data typed on the keyboard can be displayed on the terminal either directly it is entered (local echo) or as a re-transmission from the computer (remote echo). In Block Mode, a local echo is always used. |
| ENHANCEMENT, DISPLAY | Programmable screen video characteristics such as blinking, half-bright, inverse-video and underline. |
| EXTERNAL DEVICE | The device (e.g. printer) connected to the terminal. |
| ENTER | To type data on the keyboard. The **[Enter]** key is used to trigger the transfer of entered data from the terminal to the computer; in Block Mode the block of data is transmitted, in Character Mode all the current line of data displayed on the screen is re-transmitted. |

| TERM | DESCRIPTION |
|---|---|
| ESCAPE SEQUENCE | A sequence of one or more characters, where the first character is Esc (the ESCape control character), which the terminal recognizes as a special command rather than data. These sequences are normally issued by the computer to control the terminal. They are summarized at the end of this manual, and described in detail in the Reference Manual. |
| FORMAT MODE | Mode allowing forms to be created on the screen that contain protected and unprotected fields (you can only enter data in the unprotected fields, see Page 4-3). |
| FUNCTION KEYS AND SCREEN LABELS | The function keys are the eight keys labeled **[f1]** to **[f8]** located at the top of the keyboard, and are used in association with eight labels along the bottom of the screen. The function (i.e. action) of each key can be changed from the keyboard by changing the associated label (see Section 4). This allows the keys to be used as pre-set terminal control keys or user-defined keys. |
| INVERSE VIDEO | In normal video the characters are clear and the background is dark. Using inverse video, the characters are dark and the background is clear. |
| LINE | A horizontal row on the screen, capable of containing up to 80 characters (may be thought of as a line of text in a book). |
| LINE FEED | The movement of the cursor from the current line to the next line (see Return). |
| LOCAL MODE | Operating the terminal without the aid of a computer system (that is, "off-line"), so that data entered at the terminal remains in the terminal's memory. |
| MEMORY, DISPLAY | The part of the terminal's memory used to store data entered on the keyboard and/or received from a computer. |
| MEMORY, NON-VOLATILE | The part of the terminal's memory used to save configuration parameters and user-defined function key definitions when the terminal is powered-off. |
| MODE | A terminal operating state (see Block, Character, Local and Remote). |
| PAGE | The 24 lines of data (including blank lines) that can be displayed on the screen at any given time. |
| PORT | A connector for receiving/transmitting data from/ to a device. |
| REMOTE MODE | Operating the terminal with the aid of a computer system (that is, "on-line"). Data entered at the terminal can be sent to the computer, and data from the computer is displayed on the screen. |
| RESET | Set a particular function or mode to its initial state. |
| RETURN | The carriage return generated by the **[Return]** key causes the cursor to be returned to the left margin of the current line. If automatic line feed is on, the cursor is returned to the left margin of the next line. Also see Character Mode. |
| ROMAN 8 | A character set comprising USASCII and extended Roman set (national characters). |
| SIMULTAN-EOUSLY PRESS | To correctly use the **[CTRL]** and **[Shift]** keys with other keys requires that you press and hold down **[CTRL]** or **[Shift]** before pressing and then releasing the other key. |
| STATUS LINE | The bottom line (27th) of the screen used to display terminal status information. |
| WRAP-AROUND | The movement of the cursor from the right margin in a line to the left margin in the next line. |

# Installing The Terminal SECTION 1

## Contents



## Tables



## Illustrations

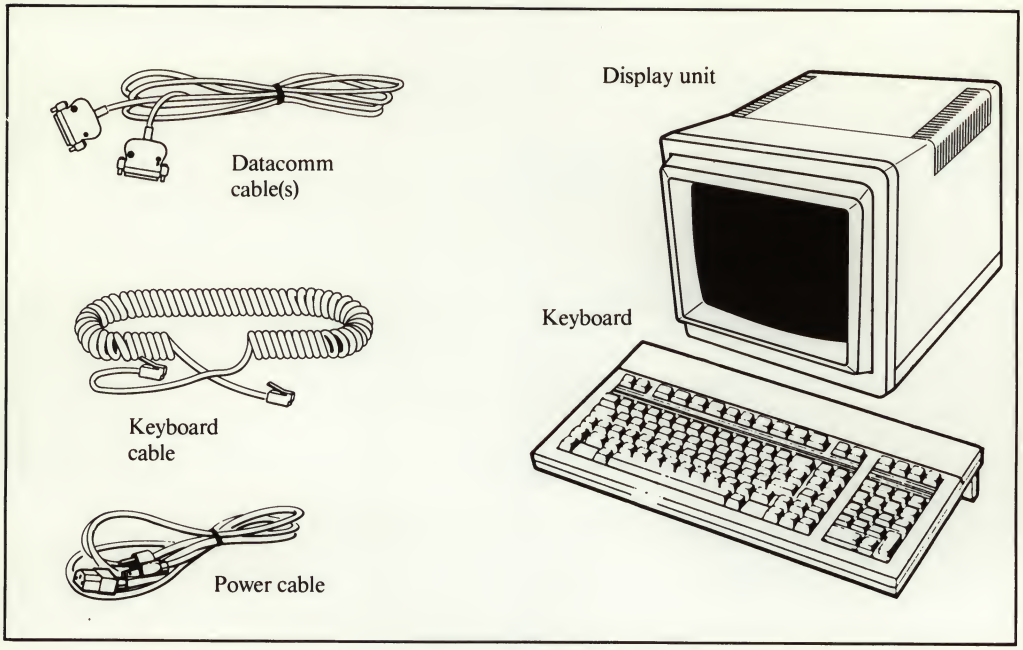


Figure 1-1. The Terminal

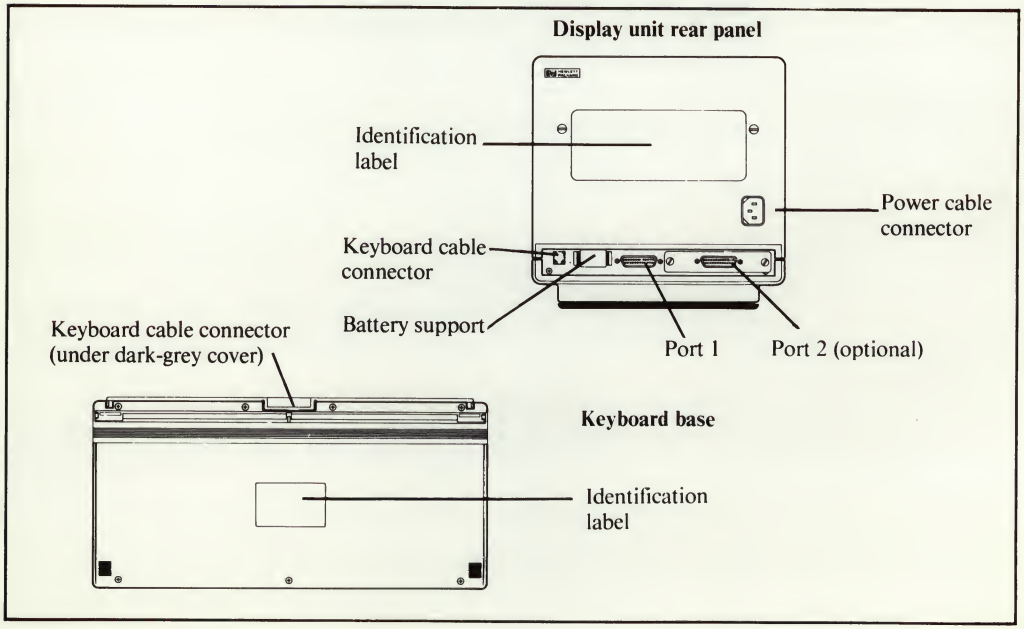


Figure 1-2. Rear Of Display Unit And Keyboard

# Installing The Terminal SECTION 1

## INTRODUCTION

Installing the terminal is as easy as:

1) Unpacking the components from the shipping cartons.
2) Identifying options and accessories.
3) Connecting the datacomm cable, keyboard cable and the power cable.

This section provides a step-by-step guide to installing the terminal. If the terminal is already installed, refer to Section 2 for details on how to switch it ON, as well as how to use it by itself (off-line), with a computer (on-line), and with a printer.

## UNPACKING AND INSPECTING THE TERMINAL

**WARNING**

IF TERMINAL IS DAMAGED DO NOT CONNECT IT TO AN ELECTRIC POWER SUPPLY; NOTIFY THE NEAREST HEWLETT-PACKARD OFFICE.

If the shipping carton is undamaged, open the top and carefully remove the contents. Place the display unit, keyboard and accessories on a clean, dry, stable surface (if possible retain the shipping carton for future use). Ensure that the correct options/accessories have been delivered by checking that all the items listed on the carton's packing list are included, and that the received shipment contains all ordered items.

In any correspondance with Hewlett-Packard regarding your terminal, specify the model, serial and option numbers listed on the identification label on the rear of the terminal.

## GETTING TO KNOW THE TERMINAL

The terminal comprises a keyboard and display unit (see Figure 1-1). The standard terminal provides up to four pages of display memory and has one datacomm port.

### Identifying Options And Accessories

An identification label located on the back of the terminal states the power requirement, model number and serial number. A similar label on the base of the keyboard provides the keyboard's product number and serial number (see Figure 1-2). Table 1-1 lists the options which may be ordered with the terminal. After receiving the terminal, you can also order some options as accessories (see Table 1-2).

The 2392A data sheet, available from your local HP office, contains complete specifications.

Table 1-1. HP 2392A Standard Terminal And Options

| | Description |
|---|---|
| Standard terminal | 115 V 60 Hz operation<br>Up to four pages of memory<br>American USASCII keyboard<br>One datacomm port: port 1 = 25-pin RS232C/HP422 port |
| Options | |
| 015 | 230 V/50 Hz |
| 049 | ANSI X 3.64 operation |
| 092 | 25-pin RS232C datacomm module } User installable Port 2 |
| 093 | 8-bit parallel datacomm module |
| 094 | Current loop datacomm module |
| 101 | Swedish } National language keyboards |
| 102 | Norwegian |
| 103 | French |
| 104 | German |
| 105 | English, UK |
| 106 | Spanish, European |
| 107 | Canadian, French |
| 108 | Canadian, English |
| 109 | Italian |
| 110 | Dutch |
| 111 | Finnish |
| 112 | Danish |
| 113 | Swiss, German |
| 114 | Swiss, French |
| 115 | Spanish, Latin American |
| 116 | Flemish |
| 149 | Delete keyboard |
| 160 | Memory extension (adds an additional four pages of display memory) |
| 301 | US modem cable (same as accessory 40242M) } Computer cables (see Reference Manual for further details) |
| 302 | European modem cable (same as 40242M) |
| 303 | RS232C cable (same as 40242C) |
| 304 | HP direct connect type 232 cable (same as 40242X) |
| 305 | EMP protect cable (same as 40242Y) |
| 306 | HP direct connect type 422 cable (same as 40242P) |
| Accessories | See Table 1-2 |

# PREPARING THE TERMINAL FOR USE

The terminal is designed to operate in a wide range of applications. It is self-contained and provides easy access to the operator controls so that normal installation does not require the terminal to be opened.

## Installing The Terminal

Place the display unit on any sturdy convenient surface such as a table, desk or stand. Ensure there is sufficient space for the keyboard, and the datacomm, keyboard and power cables. To prevent overheating, leave an air gap of at least 10 cm (4 in) between the display unit and any other equipment.

The rear of the display unit (shown in Figure 1-2) is equipped with a power cable connector (center-right), keyboard cable connector (bottom far-left), battery support (bottom left), and datacomm ports:

- Port 1 (bottom center marked ①) is a combined "RS232C and HP direct connect 422 input/output datacomm port". It is a 25-pin socket connector that can accept either an RS232C plug or an HP422 plug (refer to Table 1-1 for the relevant cable). This allows communications

Table 1-2. HP 2392A Terminal Accessories

| Number | Description | |
|---|---|---|
| 40210M | Current loop datacomm module | |
| 40210P | 8-bit parallel datacomm module | |
| 40210R | 25-pin RS232C datacomm module | |
| 40242A | Combined RS232C and HP422 adapter. Male (25-pin)/female (50-pin), 1 m (3 ft) | |
| 40242C | RS232C cable. Female (25-pin)/male (25-pin), 5 m (16 ft) | |
| 40242M | US/European modem cable. Male (25-pin)/male (25-pin), 5 m (16 ft) | |
| 40242P | HP direct connect type 422 cable. Male (25-pin)/male (5-pin), 5 m (16 ft) | |
| 40242X | HP direct connect type 232 cable. Male (25-pin)/male (3-pin), 5 m (16 ft) | |
| 40242Y | EMP protect cable. Male (25-pin)/male (25-pin), 5 m (16 ft) | |
| 40242Z | RS232C modem bypass cable. Male (25-pin)/female (25-pin), 5 m (16 ft) | |
| 40242D | Parallel printer cable. Amphenol male (36-pin)/male (36-pin), 2 m (6.6 ft) | |
| 40242E | Current loop cable. Male (9-pin)/male (9-pin), 5 m (16 ft) | |
| 40242G | Serial (RS232C) printer cable. Male (25-pin)/male (25-pin), 5 m (16 ft) | |
| 46010A | American USASCII | Keyboards |
| 46010AC | Canadian, French | |
| 46010AD | German | |
| 46010AE | Spanish, European | |
| 46010AF | French | |
| 46010AH | Dutch | |
| 46010AL | Canadian, English | |
| 46010AM | Spanish, Latin American | |
| 46010AN | Norwegian | |
| 46010AQ | Swiss, French | |
| 46010AR | Swiss, German | |
| 46010AS | Swedish | |
| 46010AU | English, UK | |
| 46010AW | Flemish | |
| 46010AX | Finnish | |
| 46010AY | Danish | |
| 46010AZ | Italian | |

with either an external RS232C-compatible device or HP422-compatible device (usually the computer).

- Port 2 (bottom right marked ②) is a "module port". This port is protected by a blank panel when the terminal is delivered. If required, this panel may be removed and a Datacomm Module fitted to provide a second communications port for an external device, usually a printer. This Datacomm Module must be ordered as an option (see Table 1-1) or an accessory (see Table 1-2).

When you receive the terminal, ensure that the battery support is securely installed. Then install the Datacomm Module (if required), before connecting the datacomm cable(s), keyboard cable, and power cable as described below.

## Installing A Datacomm Module/Port 2

CAUTION

The Datacomm Module must be handled with care. It must NOT be jarred nor allowed to come into contact with dirt, liquids or electrostatic discharge.

The Datacomm Module is a small printed circuit card that provides the connection between the terminal and the device cable. The rear of the module is equipped with a connector for plugging into port 2 of the terminal. The front of the module is equipped with a metal panel on which is mounted a connector for the device cable. The type of connector depends on the module used (see Table 1-2).

Install the module as follows:

1) Ensure that the power cable is disconnected from the terminal.
2) Unscrew the two screws securing the port 2 blanking panel in position, and remove the panel. This port is marked ②.
3) Remove the Datacomm Module from its transportation packing. Hold it by the metal panel (component side up), and carefully slide it rearwards along the port 2 slot runners. Then gently press the metal panel to ensure that the module engages with the terminal (see Figure 1-3).
4) Secure the module in position by tightening the two locking screws on either side of the metal plate.

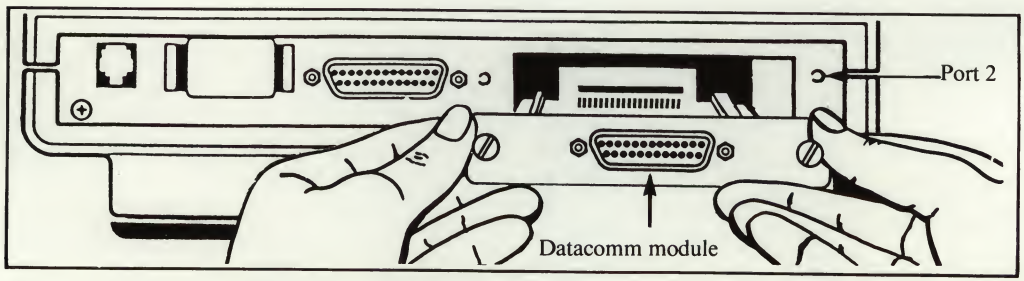


Figure 1-3. Installing A Datacomm Module

## Connecting The Datacomm Cable(s)

NOTE

1) When you connect the cables, make sure they are not tangled and that they do not restrict the terminal's swivel action. Also datacomm cables must not lie next to high voltage power cables.
2) On terminals equipped with two datacomm ports, the terminal may be connected to two external devices. However, the terminal can communicate with only ONE computer at a time.
3) The terminal can be connected to the computer either directly (hardwired), through a modem (across telephone lines) or via a cluster controller. The terminal can be connected to the printer using a direct connection only.
4) The cables listed in Tables 1-1 and 1-2 provide RFI filtering, and must be used to comply with the FCC and VDE notices at the front of this manual.

The datacomm cable (from the computer and/or device) must be connected to the correct port on the rear of the terminal (see Figure 1-2). The port connector is female, consequently the datacomm cable must be fitted with a male connector. The standard terminal has one port (port 1), but may be equipped with a Datacomm Module to provide it with a second port. The available cables are listed in Table 1-1.

Terminals equipped with only one port can only be connected to a computer. The connection must be configured as described in Sections 2 and 5.

For terminals equipped with two ports, normally port 1 (marked ①) is used for the computer connection, and port 2 (marked ②) for an external device such as a printer (i.e. port 1 = computer, port 2 = printer). However, if required the role of these two ports can be changed (i.e. port 1 = printer and port 2 = computer). The port assigned to the computer (datacomm) and printer (external device), as well as the configuration parameters, must be set as described in Sections 2 and 5.

Align the datacomm cable connector with the appropriate port. The shape of the connectors ensures a proper connection when they are correctly aligned. Gently press and rock the cable connector until the connection is made. Lock the connector in position using the screws (or clips on certain Datacomm Modules).

## Connecting The Keyboard Cable

The keyboard cable must be connected to the keyboard before being connected to the display unit. Both ends of the cable are equipped with a similar male connector plug. For the keyboard connection:

1) Remove the dark-grey plastic cover on the top edge of the keyboard that covers the keyboard's connector socket. Gently squeeze it at the center and pull it straight out (see Figure 1-4).
2) Align the keyboard cable's male connector plug with the keyboard's female connector socket (see Figure 1-4). The shape of the connectors ensures they can only connect when correctly aligned. Then press the cable's plug into the keyboard's socket, ensuring that the plug's locking tab secures them together.

3) Place the cable in the cable channel at the rear of the keyboard, ensuring that the cable passes through the slot at the end of the cable channel. Choose the slot most convenient for using the keyboard.

4) Replace the plastic cover over the cable channel as follows: hold the cover in both hands, and bend each end towards the keyboard. Then clip the cover in position at the cable end of the channel, before clipping in the other end in place. Press the cover at the center to ensure it is correctly located, with the plastic lug over the recess under the keyboard cable connector.

Connect the cable to the display unit as follows: align the keyboard cable's male plug with the display unit's socket (rear bottom far left, see Figure 1-2). Then gently press the cable's plug into the display unit's socket, ensuring that the locking tab secures the connectors together.

The base of the keyboard is equipped with a hinged stand that allows the keyboard to be mounted either flat on the table or at a slight angle.

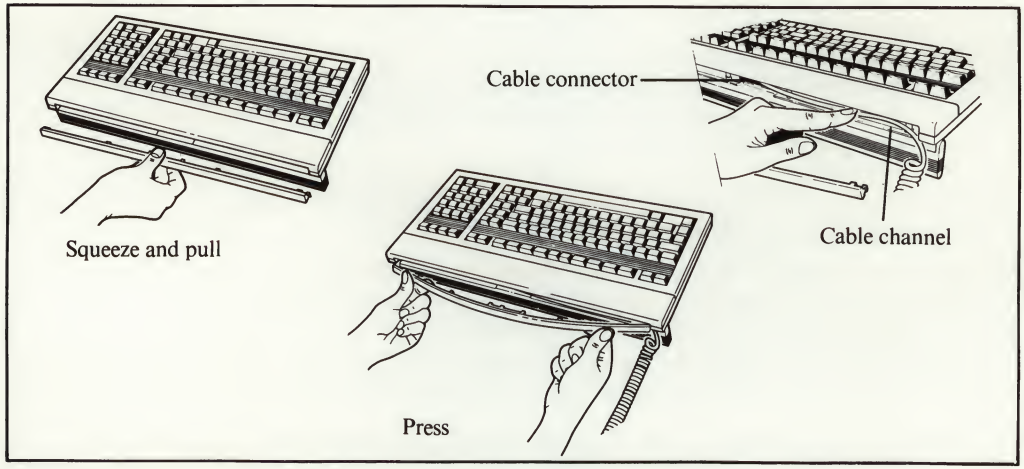


Figure 1-4. Keyboard Cable Cover

## Connecting The Power Cable

**WARNING**

1) For safety, a 3-prong grounded site power outlet socket must be used.

2) Ensure that the terminal's operating voltage (indicated on the rear panel label) corresponds to the site line voltage. If required, the terminal's voltage setting may be changed by an HP customer engineer.

An appropriate power cable is supplied with the terminal. To install the cable, first check that the power switch at the front of the terminal is OFF (protruding). Plug the power cable's female connector into the terminal's power cable connector (Figure 1-2, rear center right). Then plug the power cable's 3-prong connector into the site's power outlet socket.

# Getting Started — SECTION 2

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## Tables



## Illustrations

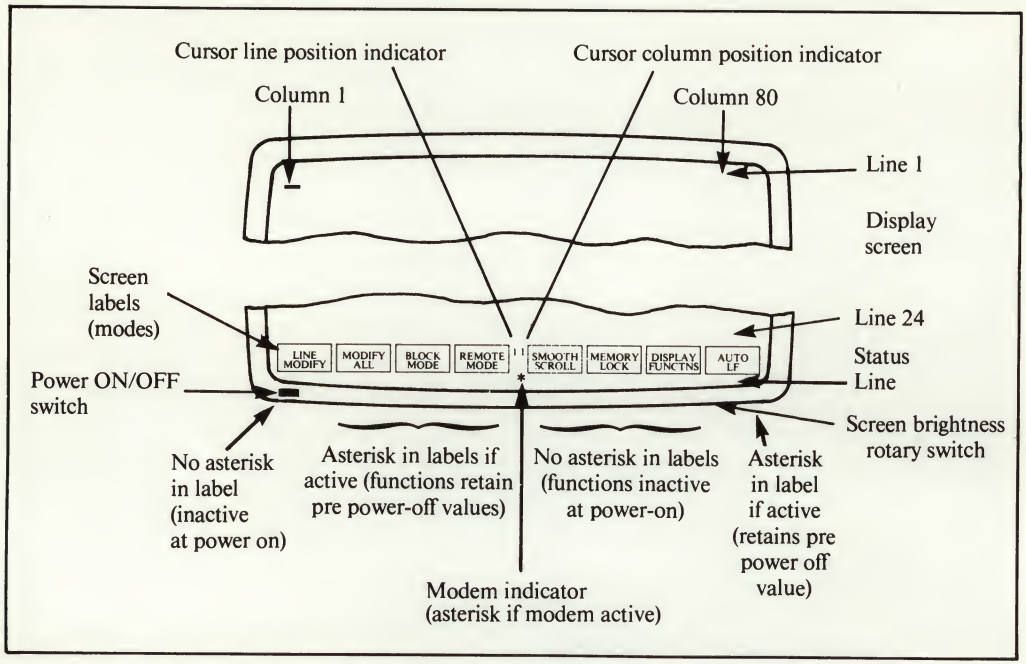



Figure 2-1. The Display Screen At Power-on

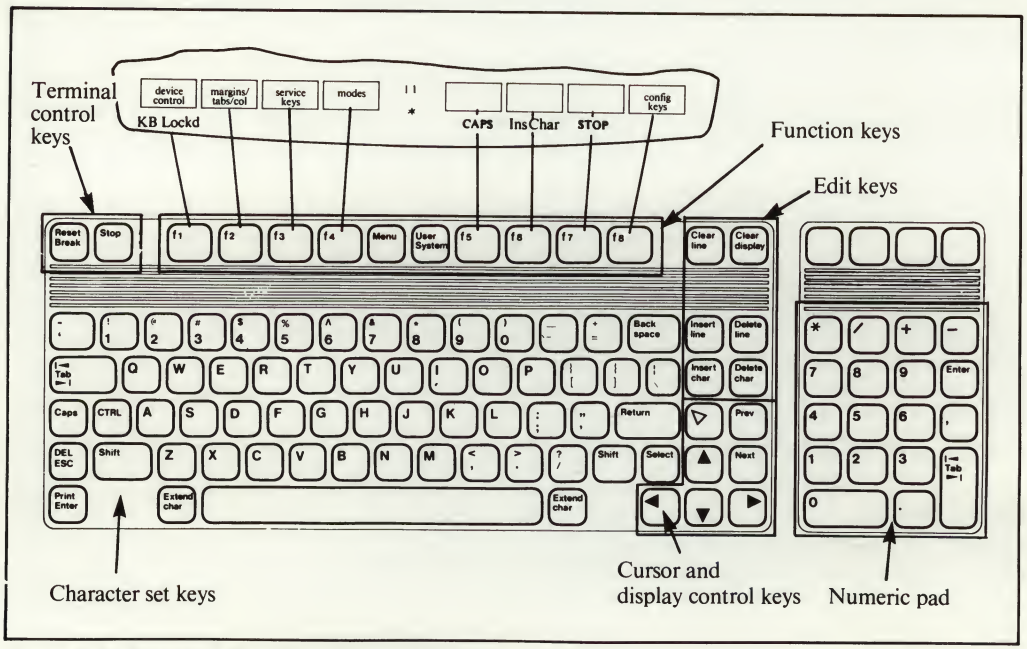



Figure 2-2. Function Keys And Screen Labels

## SWITCHING THE TERMINAL ON/OFF

### ON

Power ON the terminal by pressing in the power switch at the lower left-hand corner on the front of the terminal (see Figure 2-1). The following occurs:

1) The terminal beeper sounds. Then after approximately 10 seconds (when the terminal has successfully performed its power-on self test) the terminal beeper sounds a second time.

2) The screen then displays (see Figure 2-1):
   a) The cursor at the top left-hand corner (line 1, column 1).
   b) The eight labels associated with the MODES function (at the bottom). An asterisk in a label indicates the function is active. An asterisk is also displayed in the Status Line if a modem is operational. The rest of the screen is blank.

   If the message "Default configs used Press RETURN to clear" is displayed at the bottom of the screen in place of the labels, the batteries used to protect the non-volatile memory may have been jarred loose. Consequently, the terminal is using the pre-defined default configuration values, which may be incorrect for your application. Ensure that the battery support is securely seated (as described in Section 6), before checking the configuration as described on Pages 2-7, 2-13 and 2-19.

The terminal is then ready for use. If the terminal does not power-on as described, refer to Section 6 for troubleshooting procedures.

The knob under the right-hand side of the screen adjusts the display brightness. Display centering, focusing or height adjustments must be done by an HP customer engineer.

### OFF

To switch OFF the terminal, simply press the power switch again so when released it protrudes from the terminal.

In Remote Mode, switching OFF the terminal resets configuration parameters temporarily changed by the host computer. This may cause communications problems when the terminal is subsequently switched ON.

## TERMINAL MAIN FEATURES

### Keyboard

The keyboard has alphabetic and numeric keys similar to those on a typewriter, but arranged in colored functional groups for ease of use (see Figure 2-2):

1) The character set group allows alphabetic and numeric characters, as well as mathematical and commercial signs to be entered. It also contains data control keys such as **[Back space]** and **[Return]**.
2) The cursor and display control group moves the cursor and data around the screen.
3) The numeric group comprises a numeric key pad for the rapid entry of numeric data.
4) The edit group allows data to be inserted in and deleted from the display.
5) The function keys group selects one of several sets of labels for display at the bottom of the screen, and accesses the function indicated by the corresponding label.
6) The terminal control group is used to interrupt terminal-to-computer communications. It is also used to initialize the terminal.

When you press a key, the corresponding character is entered in the terminal. The character indicated at the bottom-half of the keycap is normally entered when the key is pressed on its own; the character indicated on the top-half of the keycap is entered when the key is shifted (simultaneously pressed with **[Shift]**). For the alphabetic keys, the lower-case letter is entered when the key is pressed on its own, and the upper-case letter when the key is shifted. This can be reversed using the **[Caps]** key. The terminal buffers (or "remembers") your keystrokes, allowing you to type at high speed and not lose any characters.

Refer to Section 3 for a complete description on how to use the keyboard.

## Function Keys

The keyboard contains function keys **[f1]** to **[f8]**, which can be used as preset terminal control keys or as user-defined keys. The functions of the keys are indicated in the associated labels at the bottom of the display screen.

**[f1] to [f8] as terminal control keys.** The terminal has five main sets of function labels. Each set assigns specific controls to the labels/function keys. Pressing the **[User System]** key displays the primary level (SYSTEM, see Figure 2-2) from which the main sets of labels can be accessed. These sets are:

- **<device control>** – used to control an external printer (only displayed on terminals fitted with two ports).
- **<margins/tabs/col>** – used to control screen margins, tabs and the start column.
- **<service keys>** – used to test the terminal
- **<modes>** – used to access terminal control modes.
- **<config keys>** – used to configure the terminal.

Pressing a function key selects the function indicated by the associated label. The screen labels that are printed in lower-case letters are used to access a sub-set of labels. The screen labels printed in CAPITAL letters are used to control the function indicated by the label. The function key toggles the specified function ON and OFF. When a function is ON, an asterisk (*) appears in the associated screen label.

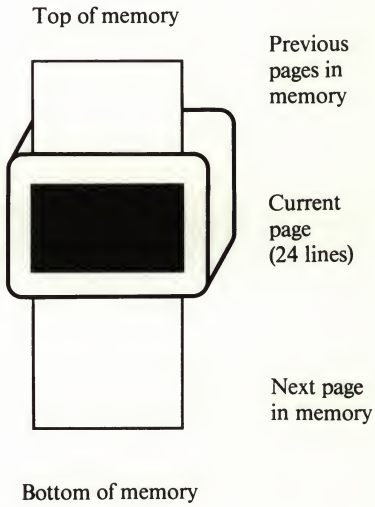
**[f1] to [f8] as user-defined keys.** The terminal has a set of user-definable labels and user-definable function keys. These are accessed when you simultaneously press keys **[Shift]** and **[User System]** (they are also accessed when you press **[CTRL]** and **[User System]**, or **[Menu]** twice). The user-defined labels appear on the screen; then when you press one of the function keys **[f1]** to **[f8]**, the user-defined string of characters is generated. This allows you to enter often-used data with a single keystroke.

By default, the user-defined labels are **<f1>** to **<f8>** and the function keys generate characters Esc p to Esc w. If you simultaneously press keys **[CTRL]** and **[Menu]**, a menu is displayed that allows you to define the information contained in the user-defined labels and function keys. See Section 3 (Function Key Group) for more details.

## Display Screen

The display can contain up to 24 lines of data and up to 80 characters per line. Lines 25 and 26 display the screen labels, and line 27 status information. Refer to Section 4 for more details.

**Display memory.** The display memory contains at least one-and-a-half pages (screens) of data. This number is increased to four pages when no display enhancements are used. If the terminal has the optional memory extension, the display memory is increased to on average eight pages (when no display enhancements are used).




**Display enhancements.** The display screen has the following enhancements that operate on a character-by-character basis: half-bright, underline, inverse video and blinking (in any combination), plus security (e.g. used for non-displayed passwords). All these enhancements are programmable using Escape sequences as described in the Reference Manual. However, these Escape sequences may also be entered on the keyboard to activate/deactivate particular enhancements. When on, the enhancements are active from the current cursor position to the end of the current line or to an existing change in enhancement (or character set) in the line, whichever occurs first. The enhancements are propagated along the line as characters are entered, and are automatically deactivated when:

- An Escape sequence for another enhancement is entered.
- The Escape sequence for end enhancement is entered. This switches off the current enhancement(s) from the cursor position to the end of the line or to an existing change in enhancement (or character set) in the line.
- The line containing the enhancement is deleted, or the enhancement activation point in the line is cleared.
- The cursor enters a new line.

Table 2-1 lists the Escape sequences used to control the enhancements. The sequence "Esc&d" must precede the display enhancement selected by one of the enhancement selection characters (upper-case A through O and S). Letters that are common to several enhancements allow these enhancements to be active at the same time. For example, pressing keys [ESC], [&], [d] and [A] causes all subsequent data entered in the line to blink. To stop the blinking, re-position the cursor at the start of the blinking, then press keys [ESC], [&], [d] and [@].

Table 2-1. Display Enhancement Operation

| Enhancement | Esc&d followed by one of the enhancement selection characters |
|---|---|
| | @ A B C D E F G H I J K L M N O S |
| Half-bright | H I J K L M N O |
| Underline | D E F G L M N O |
| Inverse video | B C F G J K N O |
| Blinking | A C E G I K M O |
| Security field | S |
| End enhancement | @ |

**Screen Labels.** The labels displayed in half-bright inverse video at the bottom of the screen are used in conjunction with the function keys [f1] to [f8] at the top of the keyboard (see Figure 2-2).

**Status Line.** The bottom line of the screen displays terminal status information:

- KB Lockd = keyboard locked indicator.
- * = modem active indicator (modem operational).
- CAPS = capitals indicator ([Caps] key pressed).
- Ins Char = insert character active indicator ([Insert char] key pressed).
- STOP = [Stop] key active indicator.

See Page 4-4 for details

NOTE

The following paragraphs explain how to use the terminal by itself, with a computer and with a printer. For more detailed information on the keyboard, screen labels and configuration menus, refer to Sections 3, 4 and 5.

# USING THE TERMINAL BY ITSELF (off-line)

When the terminal is in Local Mode, it may be used by itself. All data entered on the keyboard is treated locally. If a printer is connected, it may be used as described on Page 2-19.

## Preparing The Terminal For Use By Itself

To use the terminal by itself, you must set it to Local Mode, then configure it. This may be done as described below.

### Selecting Local Mode

The Local Mode is controlled by the function keys as follows:

1) Press the **[User System]** key to display the SYSTEM labels:

| [f1] | [f2] | [f3] | [f4] | [f5] | [f6] | [f7] | [f8] |
|---|---|---|---|---|---|---|---|
| device control | margins/ tabs/col | service keys | modes | | | | config keys |

<**device control**> is only displayed
if the terminal has a second port

2) Then press key **[f4]** (now labeled <**modes**>) to display the MODES labels:

| [f1] | [f2] | [f3] | [f4] | [f5] | [f6] | [f7] | [f8] |
|---|---|---|---|---|---|---|---|
| LINE MODIFY | MODIFY ALL | BLOCK MODE | REMOTE MODE | SMOOTH SCROLL | MEMORY LOCK | DISPLAY FUNCTNS | AUTO LF |

You can now select LOCAL MODE and also AUTO LF (automatic line feed).

**Local.** For the terminal to operate by itself, Local Mode must be selected. You should do this using key **[f4]** (labeled <**REMOTE MODE**>. When local mode is selected there is NO asterisk in the <**REMOTE MODE**> label.

**Auto LF.** Key **[f8]** (labeled <**AUTO LF**>) determines whether or not the terminal automatically generates a line feed with every carriage return (such as when the **[Return]** key is pressed). An asterisk appears in the label (<**AUTO LF***>) when you activate automatic line feed. The asterisk is removed from the label when you deactivate this function.

### Configuring The Terminal

The terminal must be configured to operate correctly. You must specify, for instance, which national keyboard is used and which national language you want for the screen label. You make the configuration selections from the keyboard. The selections remain in effect even when the terminal is switched OFF then ON, and only requires to be altered if you change the keyboard or want the labels to appear in a different language.

The terminal can be configured using the function keys as follows:

1) Press the [**User System**] key to display the SYSTEM labels:

| device control | margins/ tabs/col | service keys | modes | | | | config keys |
|---|---|---|---|---|---|---|---|
| [f1] | [f2] | [f3] | [f4] | [f5] | [f6] | [f7] | [f8] |

2) Then press key [**f8**] (now labeled <**config keys**>) to display the main configuration labels:

| | | datacomm config | ext dev config | terminal config | | | |
|---|---|---|---|---|---|---|---|
| [f1] | [f2] | [f3] | [f4] | [f5] | [f6] | [f7] | [f8] |

<**ext device config**> is only displayed if the terminal has a second port

3) Press key [**f5**] (now labeled <**terminal config**>) to display the Terminal Configuration Menu and the terminal configuration labels (see Figure 2-3).

4) To alter any of the parameters contained in the menu, place the cursor at the start of the selected parameter field (using the [**Tab**] or cursor control keys), then use key [**f2**] (<**NEXT CHOICE**>) or [**f3**] (<**PREVIOUS CHOICE**>) to display the desired value. Among the parameters that can be selected, the most important are:
   a) Datacomm/ExtDev – in terminals with two ports, this parameter selects which port is used by the computer (datacomm) and which by the external device.
   b) Keyboard – this selects the keyboard used so that the correct characters are generated. The product number on the base of the keyboard gives the keyboard type (see Table 1-2).
   c) Language – this selects which language the labels and error messages will be displayed in.

For the other parameters, the default values should be valid for most applications.

Press key [**f1**] (<**SAVE CONFIG**>) to store the value in the terminal's non-volatile memory, which causes the SYSTEM labels to be displayed. For further details, refer to Section 5.

TERMINAL CONFIGURATION

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Datacomm/ExtDev | PORT 1/PORT 2 | | | Keyboard | USASCII | | |
| Terminal Id | 2392A | | | Language | ENGLISH | | |
| LocalEcho | OFF | CapsLock | OFF | Start Col | 01 | Bell | ON |
| XmitFnctn (A) | NO | SPOW (B) | NO | InhFolWrp (C) | NO | Line/Page (D) | LINE |
| InhHndShk (G) | NO | Inh DC2 (H) | NO | EscXfer (N) | NO | | |
| FldSeparator | $_{US}$ | Blkterminator | $_{RS}$ | ReturnDef | $_{CR}$ | | |

Note: "Datacomm/ExtDev" is only displayed when the terminal is equipped with a second port (port 2). "CapsLock" only affects USASCII keyboard (ignored by terminal with national keyboard).

Terminal Configuration Menu Labels

| SAVE CONFIG | NEXT CHOICE | PREVIOUS CHOICE | DEFAULT VALUES | | | DISPLAY FUNCTNS | config keys |
|---|---|---|---|---|---|---|---|

Figure 2-3. Terminal Configuration Menu (Default Values)

## Entering Data

Displayable characters entered from the keyboard appear on the screen as they are typed, in the position indicated by the cursor. The character indicated on the bottom-half of the keycap is entered when the key is pressed on its own; the character indicated on the top-half of the keycap is entered when the key is shifted (simultaneously pressed with **[Shift]**). With alphabetic keys, the lower-case letter appears when the key is pressed on its own, and the upper-case letter when the key is shifted. This can be reversed using the **[Caps]** key.

The keys [◄], [►], [▲], [▼] and [▽] move the cursor across the screen in the direction indicated on the keycap. **[Shift]** with [▽] homes down the cursor. **[Shift]** with [▲] scrolls the page up the screen, and **[Shift]** with [▼] scrolls the page down the screen; smooth scrolling can be activated using the <**SMOOTH SCROLL**> screen label (see Page 2-7). Keys **[Prev]** and **[Next]** cause the previous and next page (24 lines) to be displayed (Figure 3-4, Section 3, depicts this operation). The **[Return]** key can be used to return the cursor to the left margin.

For example, to enter data on the screen:

1) Press key [▼] to move the cursor to the 24th line on the display (the line number is displayed between the fourth and fifth label). Then enter your name (and any other data) on this line; e.g: William Shakespeare; 1564-1616.
2) Now simultaneously press **[Shift]** and [▲] to roll your name up the screen. Note that the cursor remains in the same position on the screen, but the cursor line indicator increases in value to indicate the cursor position in display memory. Then press **[Shift]** with [▼] to roll down the screen. Note that rolling automatically stops when your name reaches the cursor (as the first line in display memory is now at the top of the screen).
3) Then press the **[Next]** key. Your name (and the cursor) jump to the top of the screen, with the next (blank) page displayed underneath. Pressing **[Prev]** returns your name to the bottom of the screen, with the previous (blank) page displayed above.

## Extended Characters ([Extend char] key)

The **[Extend char]** key may be pressed simultaneously with an alphanumeric key to access the national and displaced USASCII characters not indicated on the keycaps. The correspondence between the keys and the characters is shown in Figure 3-3. The terminal's Datacomm Configuration menu must have the "Parity/Databits" field set to "None/8" (as described on Page 2-14), otherwise the terminal's beeper sounds and no character is generated.

## Alternate Line Drawing Character Set

The terminal has an alternate line drawing character set that allows the keyboard's alphanumeric keys to generate lines of varying shape and thickness. The correspondence between the keys and the lines is shown in Figure 3-2. This may be used, for example, to draw forms, tables and illustrations on the screen.

The line drawing character set is activated by simultaneously pressing keys **[CTRL]** and uppercase or lowercase **[N]**.

The line drawing character set is deactivated (keys generate alphanumeric characters) by simultaneously pressing keys **[CTRL]** and uppercase or lowercase **[O]**. The line drawing set is automatically deactivated when the cursor enters a new line.

## Editing Data

Data displayed on the screen can be corrected in the line or position indicated by the cursor using the keyboard's edit keys (such as **[Insert line]**, **[Delete line]** and **[Delete char]**). The key **[Insert char]** is used to activate/deactivate insert mode (when active the message "Ins Char" appears in the Status Line).

For example, to edit the previous example "William Shakespeare; 1564 - 1616" changing it to "William Shakespeare; born 1564 and died 1616":

1) Use the cursor control keys to move the cursor after the semi-colon (;).
2) Press the **[Insert char]** key (the message "Ins Char" appears in the Status Line).
3) Enter the word "born", and notice "1564-1616" moves to the right. Move the cursor under the hyphen (-), and press the **[Delete char]** key to remove the hyphen. Then enter the words "and died". The line should appear as follows: "William Shakespeare; born 1564 and died 1616".
4) Press the key **[Ins char]** again. This switches off the insert character mode and removes the "Ins Char" message from the Status Line.

## Data Entry Techniques

Text margins and tabs (similar to those on a typewriter) can be set using the function keys as follows:

1) Press the **[User System]** key to display the SYSTEM labels:


2) Then press key **[f2]** (now labeled <**margins/tabs/col**>) to display the labels:


The margins and tabs can be set as described below.

### Margins

The margins are the limits of the line of text; the left margin is the start of a line and the right margin the end of the line. Characters overflowing the right margin automatically appear from the left margin. The terminal automatically beeps when you reach the eighth character position from the right margin (provided the "Bell" field in the Terminal Configuration Menu is set to "ON").

At power-on, the left margin is column 1, and the right margin column 80. You can change these margins as follows:

1) To set the left margin, move the cursor across the line to the desired position and press key **[f5]** (labeled <**LEFT MARGIN**>).
2) To set the right margin, move the column to the desired position to the right of the left margin, then press key **[f6]** (labeled <**RIGHT MARGIN**>).

To reset the margins to their power-on value, press key **[f7]** (<**CLR ALL MARGINS**>).

### Tabs

Tab stops are reference columns on the screen; for example, a single column of data in a table. Any number of tab stop positions are available (up to 80). The cursor jumps to the next tab stop when the **[Tab]** key is pressed. The cursor jumps to the previous tab stop when keys **[Shift]** and **[Tab]** are simultaneously pressed. Tab stops outside the left or right margin are ignored.

A tab stop is always set in the left margin. Additional stops may be added by moving the cursor across the line to the desired position and pressing <**SET TAB**> (key **[f2]**).

Individual tab stop(s) may be cleared by moving the cursor to the tab stop position, then pressing <**CLEAR TAB**>. Alternatively, all the tab stops may be cleared (except for the implicit stop at the left margin) by pressing <**CLR ALL TABS**>. At power-on, all the tab stops set using the <**SET TAB**> label are cleared, except for the implicit stop in the left margin (column 1 at power-on).

## Memory Lock

Memory Lock provides overflow protection for the display memory, and enables blocks of text to be locked on the screen. This allows text to be relocated on the screen. The memory lock control is accessed as follows:

1) Press the **[User System]** key to display the SYSTEM labels:

| device control | margins/ tabs/col | service keys | modes | | | | config keys |
|---|---|---|---|---|---|---|---|
| [f1] | [f2] | [f3] | [f4] | [f5] | [f6] | [f7] | [f8] |

2) Then press key **[f4]** (now labeled <**modes**>) to display the MODES labels:

| LINE MODIFY | MODIFY ALL | BLOCK MODE | REMOTE MODE | SMOOTH SCROLL | MEMORY LOCK | DISPLAY FUNCTNS | AUTO LF |
|---|---|---|---|---|---|---|---|
| [f1] | [f2] | [f3] | [f4] | [f5] | [f6] | [f7] | [f8] |

Memory Lock can be used as described below.

### Overflow Protect

Overflow Protect is used to prevent data loss due to memory overflow. It is enabled by activating Memory Lock in the first line on the screen:

1) Use the **[▲]** key to move the cursor to the first line on the screen.
2) Then press key **[f6]** (labeled <**MEMORY LOCK**>), and ensure that an asterisk appears in the label (<**MEMORY LOCK***>).

Data can then added up to the end of the display memory. At the end of the memory, no additional data can be added; if attempted, the error message "MEMORY FULL Press RETURN to clear" is displayed. Existing data, however, can be modified, provided no new lines or display enhancements are created.

Overflow Protect Mode is disabled by deactivating Memory Lock (pressing **[f6]** again).

**Display Lock**

Display lock is used to lock lines of text at the top of the screen (such as column headings in tables) so they do not move when using Roll Up/Down and Home Up/Down. Display lock is enabled by activating Memory Lock below the last line of data that you want to be retained on the screen. This locks all the data between the first line on the screen and the line above the cursor. If new lines are added (below the locked ones) and the screen is full, existing non-locked lines are rolled up under the locked lines and placed in the memory above the locked data. Roll Up/Down and Home Up/Down may be used to move the non-locked lines under the locked ones. Note that edit keys, including **[Insert line]** and **[delete line]**, can still be used in the locked area but the total number of locked lines remains the same. Therefore when the cursor is in the locked area, inserting a line will push a locked line into the locked area, and deleting a line may pull a non-locked line into the locked area.

Display lock can be used to relocate blocks of text on the screen. For example, to correct the order of the following text displayed at the top of the screen.

TOP OF SCREEN _____

Line 5 It comes upon me. Art thou anything?
Line 1 *** Enter the ghost of Caesar ***
Line 2 How ill this taper burns! Ha! Who comes here?
Line 3 I think it is the weakness of mine eyes
Line 4 that shapes this monstrous apparition.

To move "line 5" to the last position:

1) Press the [▷] key, ensure the text is at the top of the screen.
2) Position the cursor in "line 1" (i.e. after "line 5").
3) Activate memory lock by pressing key **[f6]** (labeled <**MEMORY LOCK**>); ensure an asterisk appears in the label <**MEMORY LOCK***>. This locks "line 5" on the screen.
4) Use **[Shift]** [▲] to roll up lines 1, 2, 3 and 4 under line 5 and off the top of the screen.
5) Deactivate memory lock (repress key **[f6]**) and ensure the asterisk disappears from the label <**MEMORY LOCK**>.
6) Press the [▷] key, the text should then be displayed as follows:

TOP OF SCREEN _____

Line 1 *** Enter the ghost of Caesar ***
Line 2 How ill this taper burns! Ha! Who comes here?
Line 3 I think it is the weakness of mine eyes
Line 4 that shapes this monstrous apparition.
Line 5 It comes upon me. Art thou anything?

## Reset

The **[Reset Break]** key pressed on its own = BREAK, pressed with **[Shift]** = SOFT RESET, pressed with **[Shift]** and **[CTRL]** = HARD RESET.

- In Local Mode BREAK has no action.
- A SOFT RESET of the terminal unlocks the keyboard, etc. (see Section 3).
- A HARD RESET is equivalent to power-on, except that a terminal self test is not performed. (The user-defined keys/labels retain their preset values. They are reset to their default values by a hard reset from the computer).

# USING THE TERMINAL WITH A COMPUTER (on-line)

When in Remote Mode, the terminal can be used with a (remote) computer. Data entered on the keyboard can be sent to a computer for processing, and data from the computer can be displayed on the screen and/or sent to an external printer. This is also known as on-line operations.

The terminal can be connected to the computer system directly, through a modem (across telephone lines) or through a cluster controller. Since the terminal can only receive data from one device, only one computer at a time can be connected to the terminal.

## Preparing The Terminal For Use With A Computer

To use the terminal with a computer, you must configure the terminal and the terminal-to-computer data communications, as well as set the terminal to Remote Mode. This may be done as described below.

### Configuring The Terminal

The terminal must be configured to operate correctly, this can be done as described on Page 2-7. Contact your EDP department for a list of the terminal configuration parameter values required for your application. Typical parameters to check are:

1) Datacomm/ExtDev – in terminals with two ports, this parameter selects which port is used by the computer (datacomm) and which by the external device.
2) Keyboard – should be set to select the keyboard used.
3) Language – should be used to select the labels/error message language.
4) CapsLock – may be used if the computer cannot accept lower case letters (USASCII keyboard only). That is, the terminal generates only teletype-compatible codes.
5) LocalEcho – should be selected in Character Mode if the computer does not perform a remote echo.
6) Line/Page – should be used in Block Mode to select the block size.

For the remaining parameters, in most cases the default values should be valid.

### Configuring The Terminal-to-computer Communications

The terminal-to-computer communication parameters must be configured for the terminal to correctly transmit/receive data. This must be done initially from the keyboard. Once set, provided the computer is not changed, the configuration does not require changing (even if the terminal is switched OFF then ON).

Contact your EDP department for a list of the datacomm configuration parameter values required for your application. In most cases, you will find that the terminal's pre-defined default values are valid. However, if required, the parameters can be changed as described below. This should only be done when the terminal is off-line, and before trying to log onto the computer.

1) Press the **[User System]** key to display the SYSTEM labels:

| device control | margins/ tabs/col | service keys | modes | | | | config keys |
|---|---|---|---|---|---|---|---|
| [f1] | [f2] | [f3] | [f4] | [f5] | [f6] | [f7] | [f8] |

<**device control**> is only displayed
if the terminal has a second port

2) Then press key **[f8]** (now labeled <**config keys**>) to display the main configuration labels:

| | | datacomm config | ext dev config | terminal config | | | |
|---|---|---|---|---|---|---|---|
| [f1] | [f2] | [f3] | [f4] | [f5] | [f6] | [f7] | [f8] |

<**ext device config**> is only displayed
if the terminal has a second port

3) Press key **[f3]** (now labeled <**datacomm config**>) to display the datacomm configuration menu and the datacomm configuration labels (see Figure 2-4).

4) To alter any of the parameters contained in the menu, place the cursor at the start of the selected parameter field (using the **[Tab]** or cursor control keys), then use key **[f2]** (<**NEXT CHOICE**>) or **[f3]** (<**PREVIOUS CHOICE**>) to display the desired value. Among parameters that can be selected, the most important are:

   a) BaudRate – selects the communications speed.

   b) Parity/DataBits – allows data checking. The value should normally be "None/8".

Press key **[f1]** (<**SAVE CONFIG**>) to store the value in the terminal's non-volatile memory (this causes the SYSTEM labels to be displayed). For further details, refer to Section 5.

DATACOMM CONFIGURATION

BaudRate [2400] Parity/DataBits [None/8] EnqAck [YES]

Asterisk [OFF] Chk Parity [NO] SR (CH) [LO]

RecvPace [None] CS (CB) Xmit [NO]

XmitPace [None]

Note: With a current loop datacomm module, parameter "CS (CB) Xmit" should be set to "NO".

Datacomm Configuration Menu Labels

| SAVE CONFIG | NEXT CHOICE | PREVIOUS CHOICE | DEFAULT VALUES | | | DISPLAY FUNCTNS | config keys |
|---|---|---|---|---|---|---|---|

Figure 2-4. Datacomm Configuration Menu (Default Values)

### Selecting The Terminal Operating Modes

The terminal can be operated in several modes when connected to a computer. These modes are controlled by the function keys as follows:

1) Press the **[User System]** key to display the SYSTEM labels:

| device control | margins/ tabs/col | service keys | modes | | | | config keys |
|---|---|---|---|---|---|---|---|
| [f1] | [f2] | [f3] | [f4] | [f5] | [f6] | [f7] | [f8] |

2) Then press key **[f4]** (now labeled <**modes**>) to display the MODES labels:

| LINE MODIFY | MODIFY ALL | BLOCK MODE | REMOTE MODE | SMOOTH SCROLL | MEMORY LOCK | DISPLAY FUNCTNS | AUTO LF |
|---|---|---|---|---|---|---|---|
| [f1] | [f2] | [f3] | [f4] | [f5] | [f6] | [f7] | [f8] |

REMOTE MODE, BLOCK/CHARACTER MODE and AUTO LF (automatic line feed) can now be selected.

**Remote.** For the terminal to operate with a computer, Remote Mode must be selected. Use key **[f4]** (labeled <**REMOTE MODE**>). When Remote Mode is selected an asterisk appears in the label (<**REMOTE MODE***>).

**Block mode.** Key **[f3]** (labeled <**BLOCK MODE**>) is used to select whether data is sent to the computer in blocks of characters (Block Mode) or character-by-character as they are typed (Character Mode). The setting must conform to the computer program. When Block Mode is selected an asterisk appears in the label (<**BLOCK MODE***>). When Character Mode is selected the asterisk is removed.

When in Block Mode, the size of the block transmitted to the computer (line or page(s)) must be selected using the Terminal Configuration Menu (see Page 2-7).

**Auto LF.** Key **[f8]** (labeled <**AUTO LF**>) selects whether or not a line feed is generated with every carriage return (such as when the **[Return]** key is pressed). When you select automatic line feed, an asterisk appears in the label (<**AUTO LF***>). When you deactivate automatic line feed, the asterisk is removed. When communicating with a computer in Character Mode, automatic line feed should normally be deactivated.

### Record Mode

Record Mode is only accessible from the keyboard on terminals equipped with two ports. This mode allows data to be transferred from the computer to the destination ("to") device in blocks of up to 256 characters. The destination can be the screen and/or the external device. All keyboard data entries are disabled while the terminal is operating in Record Mode.

To use this mode, first select the "to" device(s) and then select Record Mode as follows:

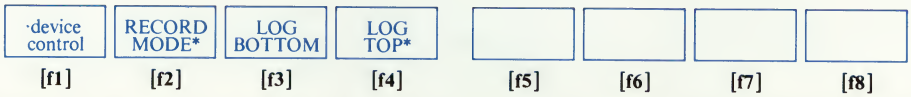
1) Press the [**User System**] key to display the SYSTEM labels:


<**device control**> is only displayed if the terminal has a second port

2) Then press key [**f1**] (now labeled <**device control**>) to display the device control labels:


3) Select the destination by using keys [**f2**] (<**TO EXT DEV**>) and [**f3**] (<**TO DISPLAY**>); either or both may be activated.

4) Then press key [**f1**] (<**device modes**>) to display the labels:




5) Press key [**f2**] and ensure an asterisk appears in the label (<**RECORD MODE***>). While in Record Mode, the keyboard is disabled except for the [**Shift**], [**CTRL**] and [**Reset Break**] keys, and <**RECORD MODE**> label (key [**f2**]). Pressing [**f2**] again terminates Record Mode.

If data logging or data copying operations are required, refer to Page 2-22 for details.

### If A Modem Or Cluster Controller Is Used

If a modem or cluster controller is used, it may be necessary to turn it on and configure it (refer to the manufacturer's instructions). The data transmission speed and parity setting should be the same as the terminal's. The terminal's settings may be observed by displaying the Datacomm Configuration Menu (Figure 2-4).

## Receiving Data From A Computer

No special action is required to receive data from a computer, other than setting the terminal to Block Mode or Character Mode, making sure that the port is correctly configured, and assigning the correct destination for data. If a printer is used, refer to Page 2-19.

## Sending Data To The Computer

Data can be sent from the keyboard to the computer in either Block Mode or Character Mode.

### Block Mode

In Block Mode, data entered on the keyboard is displayed on the screen and stored in the terminal until the [**Enter**] or [**Print Enter**] key is pressed. A copy of the data is then transmitted as a block. The block size can be either a line or page(s), and is selected in the Terminal Configuration Menu.

### Character Mode

**Normal operations.** In Character Mode, each character is sent to the computer as it is typed on the keyboard. The "LocalEcho" field in the Terminal Configuration Menu selects if the typed data is displayed directly it is entered (local echo) or as a re-transmission from the computer (remote echo). Pressing the [**Return**] key informs the computer that the transfer is finished (terminated). The [**Enter**] key may also be used to terminate a transfer. Its use, however, depends on the computer program. This is because pressing [**Enter**] retransmits the current line, and if the "InhHndShk (G)" and "InhDC2 (H)" fields in the Terminal Configuration Menu are set to "YES" and "NO" respectively the handshake is activated. See the Reference Manual for details.

**Modify mode.** When operating in Character Mode, two modify modes are available for editing a line of data displayed on the screen and re-transmitting it to the computer. These two modes are called Line Modify and Modify All, and are activated as follows:

1) Press the [**User System**] key to display the SYSTEM labels:


2) Then press key [**f4**] (now labeled <**modes**>) to display the MODES labels:


Key [**f1**] controls Line Modify mode. For example, if a line of data sent to the computer contains an error and the computer returns an error message, you need not retype all the data. Instead, simply move the cursor into the line to be corrected, activate Line Modify mode, correct the error, and retransmit the entire line by pressing the [**Return**] or [**Enter**] key. This automatically deactivates Line Modify mode.

Key [**f2**] controls Modify All Mode. Modify All is used in the same way as Line Modify. The one difference is the mode is NOT automatically deactivated when the [**Return**] or [**Enter**] key is pressed, but must be deactivated by pressing key [**f2**] again.

**Start column.** The terminal automatically sets a logical start-of-text pointer in the leftmost column in which data was entered from the keyboard. In Modify Line and Modify All mode, the transmission starts from this pointer when the [**Return**] or [**Enter**] key is pressed. If no pointer exists for the line (such as for a line received from the computer), the transmission starts from the start column defined in the Terminal Configuration Menu. All characters to the left of the start column (such as a computer prompt) are ignored. See the Reference Manual for details.

The start column feature (accessed in the margins/tabs/col labels) may be used to temporarily change the start column. To access the start column feature:

1) Press the [**User System**] key to display the SYSTEM labels:


2) Then press key [**f2**] (now labeled <**margins/tabs/col**>) to display the labels:


3) Move the cursor along the line to the desired start point, then press key [**f1**] (labeled <**START COL**>). This temporarily redefines the start column set in the Terminal Configuration Menu. The start column returns to the value set in the Terminal Configuration Menu at power-on or after a hard reset. See to the Reference Manual for further details.

## Data Communications Control Keys

The following keys are used when communicating with the computer:

[**back space**] Moves the cursor one character position backwards along the line. The displayed character remains on the screen. In Character Mode communications, backspace causes the previous entered character to be deleted from the computer file. Consequently, [**Back space**] (not [◄]) should normally be used to move the cursor backwards along the line in order to correct an error in data sent to the computer.

[**Print Enter**] Pressed on its own = ENTER, pressed with [**Shift**] = PRINT.

- PRINT copies the data in the display memory to the printer. An error message is displayed if the printer is not set as the "to" device (see Page 2-22).
- In Remote Mode ENTER triggers a transfer of a copy of the data in display memory to the computer: the current line in Character Mode; the current line or page(s), as configured, in Block Mode.

[**Reset Break**] Pressed on its own = BREAK, pressed with [**Shift**] = SOFT RESET, pressed simultaneously with [**Shift**] and [**CTRL**] = HARD RESET.

- In Remote Mode BREAK interrupts the terminal-to-computer data communications. The computer's response depends on the program; for example, it may cause the computer to exit the current application program and return to the main system program.
- SOFT and HARD RESET operate the same as for local mode (see Section 3).

**[Return]** Used to return the cursor to the left margin of the line. Also in Character Mode data communications with the computer, used to log onto the computer in order to receive a "user prompt", and to terminate a data transfer to the computer.

**[Select]** Used to indicate to the computer a selected position on the screen; e.g., the start of a form or menu.

**[Stop]** Acts as an ON/OFF toggle switch to temporarily halt (then start) the flow of data from the computer to the screen. This allows received data to be checked in small quantities. When ON, the message "STOP" appears in the Status Line. The Datacomm Configuration Menu must have the "RecvPace" field set to "XON/XOFF" (see Page 2-14), otherwise **[Stop]** has no effect.

# USING THE TERMINAL WITH AN EXTERNAL DEVICE

When the terminal is equipped with a second port, it can be used with an external device (such as a printer).

## Preparing The Terminal For Use With A Device

To use the terminal with a device, it is necessary to configure the terminal and the terminal-to-device communication parameters, as well as assign the external device as the "to" device for the keyboard and/or computer data. Contact your EDP department for a list of the configuration parameter values required by your application.

### Configuring The Terminal

The terminal must be configured to operate correctly. This may be done as described on Page 2-7. Use the parameter "Datacomm/ExtDev" to select which port is used by the computer (datacomm) and which by the external device.

### Configuring The Terminal-to-device Communications

The terminal-to-device communication parameters must be configured so that the terminal can correctly transmit data. This must be initially done from the keyboard. Provided the device is not changed, the configuration does not require changing (even if the terminal is switched OFF then ON).

Refer to the external device's technical documentation for the appropriate configuration parameters. In most cases, you will find that the terminal's pre-defined default values are valid. However, if required, the parameters can be changed as described below.

1) Press the **[User System]** key to display the SYSTEM labels:

| device control | margins/ tabs/col | service keys | modes | | | | config keys |
|---|---|---|---|---|---|---|---|
| [f1] | [f2] | [f3] | [f4] | [f5] | [f6] | [f7] | [f8] |

2) Then press key **[f8]** (now labeled <**config keys**>) to display the main configuration labels:

| | | datacomm config | ext dev config | terminal config | | | |
|---|---|---|---|---|---|---|---|
| [f1] | [f2] | [f3] | [f4] | [f5] | [f6] | [f7] | [f8] |

3) Press key **[f4]** (now labeled <**ext dev config**>) to display the external device configuration menu and the configuration labels (see Figure 2-5). The label is only available on terminals equipped with two ports.

4) To alter any of the parameters contained in the menu, place the cursor at the start of the selected parameter field (using the **[Tab]** or cursor control keys), then use key **[f2]** (<**NEXT CHOICE**>) or **[f3]** (<**PREVIOUS CHOICE**>) to display the desired value. Among the parameters that can be selected, the most important are:
   a) BaudRate – this selects the terminal-to-device data transmission rate.
   b) PrinterType – this selects the printer type for the transmission of national characters (see the Reference Manual for details).

Press key **[f1]** (<**SAVE CONFIG**>) to store the value in the terminal's non-volatile memory, which causes the SYSTEM labels to be displayed.

EXTERNAL DEVICE CONFIGURATION

BaudRate [2400] Parity/DataBits [None/8] PrinterNulls [000]

PrinterType [ROMAN8]

SSRXmit [NO]

XmitPace [None] SRRInvert [NO] CS (CB) Xmit [NO]

Note: With parallel datacomm module, parameters "SRRXmit" and "CS (CB) Xmit" should be set to "NO".

External Device Configuration Menu labels

| SAVE CONFIG | NEXT CHOICE | PREVIOUS CHOICE | DEFAULT VALUES | | | DISPLAY FUNCTNS | config keys |
|---|---|---|---|---|---|---|---|

Figure 2-5. External Device Configuration Menu (Default Values)

### Selecting The Device As The Destination

The destination is the "to" device for a data transfer.

In Local Mode, data entered on the keyboard always appears on the screen. Setting the external device as the "to" device allows data to be copied from the screen to the printer as described on Page 2-22 (in Local Mode, setting the display as the "to" device has no effect).

In Remote Mode:

- For a Local Echo, data entered on the keyboard always appears on the screen. Setting the external device as the "to" device allows data to be copied from the screen to the printer as described on Page 2-22.
- For data received from the computer (either as a direct transmission or as a remote echo of a keyboard entry):
  - For normal operations the data appears on the screen, and the external device can be set as the "to" device for data logging (top/bottom) operations.
  - If Record Mode is selected, the display and/or the external device can be selected as the destination. Record Mode only operates for data received from the computer, as described on Pages 2-15 and 2-22.

  Note that when logging data in Remote Mode or when using Record Mode, the terminal to computer datacomm must either use a handshake, or a communications speed (baud rate) equal to or less than the baud rate used for the printer (see the Reference Manual).

Specify the "to" device as follows:

1) Press the [**User System**] key to display the SYSTEM labels:


<**device control**> is only displayed if the terminal has a second port.

2) Then press key [**f1**] (now labeled <**device control**>) to display the labels:


3) Select the destination using key [**f2**] (<**TO EXT DEV**>) and/or [**f3**] (<**TO DISPLAY**>). Either or both may be activated (but <**TO DISPLAY**> only has an action when using Record Mode).

## Logging Data

Data logging causes data entered in the terminal (through the keyboard or received from the computer) to be automatically sent to the "to" device. This is achieved as follows:

1) Press key [f1] (<**device modes**>) to display the labels:


2) Then press key [f2], [f3] or [f4] to select either RECORD MODE or LOG BOTTOM or LOG TOP (ensure an asterisk appears in the labels). Pressing the key again deactivates the function. LOG BOTTOM and LOG TOP are mutually exclusive (they cannot both be selected at the same time), so activating top logging automatically deactivates bottom logging (and vice-versa).
   a) In Record Mode, data is transferred from the computer to the destination devices in blocks of up to 256 characters. While in Record Mode, the keyboard is disabled except for the [**CTRL**], [**Shift**], and [**Reset Break**] keys, and <**RECORD MODE**> label (key [f2]).
   b) When the top logging is used, the top line of data contained in the display memory is sent to the device when it is rolled off the top of the memory by new lines being added at the bottom. LOG TOP is inhibited if overflow protect is active (see Page 2-11).

When logging data in the Local Mode, if neither the device nor display is set as the "to" device, the error message: "No "TO" device Press RETURN to clear" is displayed. If only the display is set as the "to" device, the error message: "Source = Destination Press RETURN to clear" is displayed. (A message is not displayed in Remote Mode).

## Copying Data

Copying data causes data on the screen to be copied to the device. This can be achieved as follows:

1) The DEVICE CONTROL (see previous page): <**ADVANCE PAGE**>, <**ADVANCE LINE**>, <**COPY ALL**>, <**COPY PAGE**> and <**COPY LINE**> control the external device (see Section 4 for details). <**COPY PAGE**> and <**COPY ALL**> can be stopped (at end of current line) by pressing the [**Return**] key.

2) [**Print Enter**] key – pressed on its own = ENTER, pressed with [**Shift**] = PRINT. In Local Mode, PRINT or ENTER causes a copy of all the data in the display memory (except any lines locked at top of screen using memory lock, see Page 2-12) to be sent to an external printer. In Remote Mode, PRINT copies the displayed data to the printer, and ENTER triggers a transfer of a copy of the displayed data to the computer. When a configuration menu is displayed (in both Local and Remote Mode), PRINT or ENTER copies the menu to the external printer (when the User Key Definition Menu is displayed the [**Print Enter**] key operates "normally").

When data is being copied to an external device, keyboard entries are not executed until the transfer is complete (and only the last eight alphanumeric entries are recorded in memory).

If the external device is not set as the "to" device (and the display is not set as the "to" device) the error message: "No "TO" device Press RETURN to clear" is displayed. If only the display is set as the "to", the error message: "Source = Destination Press RETURN to clear" is displayed (because the display is automatically the "from" device when copying data). If a second port is not installed, no action is taken.

# The Keyboard — SECTION 3

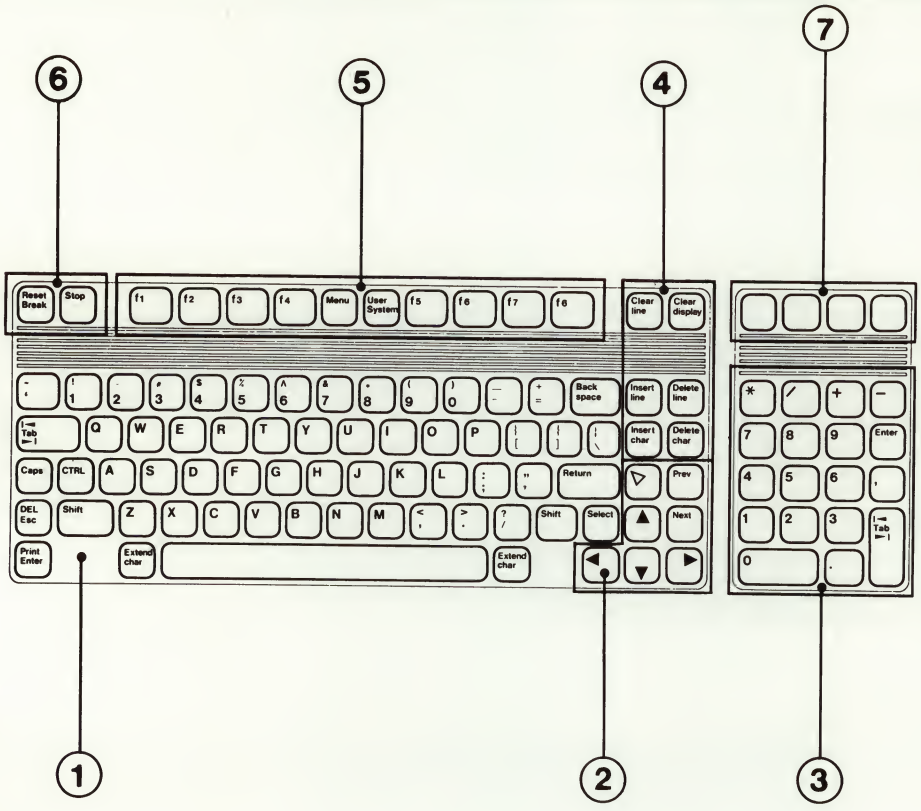
## Contents



## Tables



## Illustrations




1 = character set group
2 = cursor and display control group
3 = numeric group
4 = edit group
5 = function key group
6 = terminal control group
7 = non-functioning keys

Refer to Figures 3-7 and 3-8 for the English and Canadian keyboards.

Figure 3-1. The Keyboard (American USASCII)

# The Keyboard SECTION 3

## NATIONAL LANGUAGE KEYBOARD OPTIONS

The terminal may be equipped with one of several keyboards – American or national language (the available keyboards are listed in Table 1-1). Each keyboard generates characters from the ROMAN 8 character set. This set of characters includes the 128 standard USASCII characters plus Roman Extension characters (accented characters).

On the American keyboard, the keycaps are marked with the ASCII character, and the keys are arranged in QWERTY order.

On the national keyboards, the keycaps are marked with the national characters (and in the national language), and the alphabetic/symbol keys are arranged in the order normally used by that language. Some ASCII characters (and also some national characters) are displaced; that is the position of certain keys generating the same characters varies from keyboard to keyboard. See Figure 3-6 to 3-22.

The terminal must be configured for the type of keyboard used. In this way, the character indicated on the keycap is the character generated on the screen (see Sections 2 and 5). In addition:

1) When the terminal is configured for 7-bit operations, only the characters indicated on the keycaps can be displayed. Other national characters and displaced ASCII characters cannot be accessed via the **[Extend char]** key.
2) When the terminal is configured for 8-bit operations, all the ROMAN 8 characters can be accessed. The Roman Extension and displaced ASCII characters not directly available (not indicated on the keycaps) are accessible using the **[Extend char]** key.

## KEYBOARD FUNCTIONAL GROUPS

Each keyboard has 107 keys. Pressing a key causes the corresponding character to be entered into the terminal, and if a key is continuously pressed the character is repeated. These keys can be divided into six functional groups (see Figure 3-1) which are color-coded on the keyboard (white, light-grey and dark-grey) for ease of use:

1) Character Set Group. This group contains keys similar to those on a typewriter – alphabetic keys A to Z, numeric keys 0 to 9, mathematical/commercial signs and control keys such as **[Backspace]**, **[Enter]** and **[Return]**.
2) Cursor and Display Control Group. This group controls the position of the cursor and the movement of the displayed data on the screen (such as roll up).
3) Numeric Group. This group forms a numeric key pad for the rapid entry of numeric data.
4) Edit Group. This group allows data to be inserted in and deleted from the displayed text.
5) Function Keys Group. These keys are used to select the type of information contained in the screen labels (at the bottom of the screen), and access the function indicated by the corresponding label.
6) Terminal Control Group. The keys in this group are used to interrupt terminal-to-computer and terminal-to-device communications, and initialize the terminal.

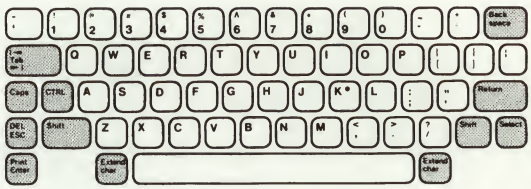
Note the four unmarked keys above the numeric pad are non-functioning keys.

## CHARACTER SET GROUP

This is the largest group on the keyboard, comprising 60 keys capable of generating 96 characters; including upper and lower-case alphabetic characters, numeric characters, space, punctuation, and some commercial symbols. Several data control keys are also available. The character indicated on the bottom-half of the keycap is the standard (or base) character generated by the key. The character indicated on the top-half of the keycap is the shifted character.

### Displayable Character Keys

The displayable characters include alphanumerics, punctuation and commercial symbols. Pressing a key causes the character indicated on the keycap to be entered into the terminal. A space is entered using the un-marked space bar at the bottom of the keyboard.



The character indicated at the bottom-half of the keycap is entered when the key is pressed on its own. The character indicated on the top-half of the keycap is entered when the key is shifted (simultaneously pressed with [**Shift**]). For the alphabetic keys, the lower-case letter is entered when the key is pressed on its own, and the upper-case letter when the key is shifted. This may be reversed using the [**Caps**] key. The terminal buffers (or "remembers") your keystrokes, allowing you to type at high speed without losing any characters.

The position of the keys generating the same character varies from keyboard to keyboard. Because of this, if the keyboard is not the same as that set in the Terminal Configuration Menu, the character generated by a key will not correspond to that indicated on the keycap. Any keyboard can be used to generate characters from any national language (provided the "Parity/DataBits" field in the Datacomm Configuration Menu is set to "None/8") as follows:

1) Using the [**Extend char**] key; in which case Figure 3-3 should be consulted to determine the character generated by each key.
2) By changing the configured keyboard type; in which case Figures 3-6 to 3-22 should be consulted to ascertain the character generated by each key.

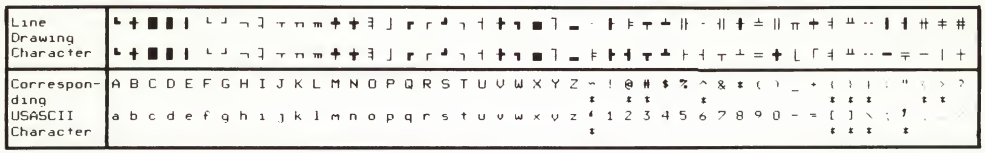
#### Line-drawing Character Set

The terminal has an alternate line-drawing character set that allows the keyboard's alphanumeric keys to generate lines of varying thicknesses and angles. This character set may be used, for example, to draw tables and illustrations on the screen, and is also used by the computer to create forms. The correspondence between the alphanumeric characters and the line elements is shown in Figure 3-2. Note that as the position of keys generating the same alphanumeric character varies from keyboard to keyboard, so does the position of line elements. Also, national language characters that do not have a corresponding line element generate a space.

The line drawing character set is activated by simultaneously pressing keys [**CTRL**] and upper/lower-case [**N**]. The character set is active from the current cursor position to the end of the current line, or to an existing change in character set (or display enhancement) in the line, whichever occurs first.

The line drawing character set is deactivated (keys generate alphanumeric characters) when:

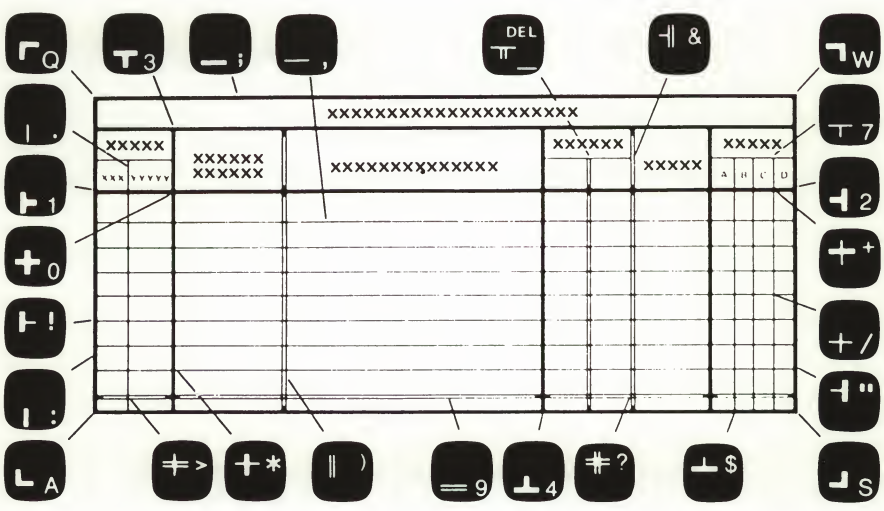
- You simultaneously press keys [**CTRL**] and upper-case (or lower-case) [**O**]. This deactivates the alternate set from the current cursor position to the end of the line, or to an existing change in character set (or display enhancement) in the line.
- The line containing the alternate set is deleted, or the alternate set activation point in the line is cleared.
- The cursor enters a new line.




With national keyboards, the USASCII characters marked "*" (below) may not be directly available (that is, do not appear on keycaps). When the terminal is configured for 8-bit operations, these USASCII characters must be accessed using the [Extend char] key. When the terminal is configured for 7-bit operations, these USASCII characters are replaced by national characters that must be used instead (see Table 3-2). A sample form is shown in Table 3-1.

Figure 3-2. Correspondence Between Alphanumeric Characters And Line-drawing Character Set Elements

Table 3-1. Sample Data Entry Form




Note: On Swiss French and Swiss German keyboards, in 7-bit operations use "è" instead of ">" to generate the "≠" element (see Table 3-2).

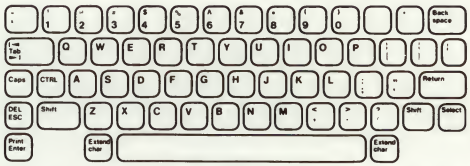
### Diacritical Combinations

Some national keyboards employ accented characters that do not appear on a keycap but which are formed by combining two characters; normally a diacritic mark plus an alpha character (for example, a circumflex plus a vowel). The terminal handles these characters as follows:

1) When a character is typed that corresponds to the first part of a diacritical combination (for the configured keyboard type), it is displayed on the screen and the cursor remains under it.
2) When the next character is typed:
   a) If it is a valid character (one giving a valid diacritical combination) the combination is displayed and the cursor moves to the next character position.
   b) If it is an invalid character (other than space), it replaces the previously displayed character.
   c) If it is a space, the first character remains displayed on the screen, and the cursor moves to the next character position.

Table 3-2 lists diacritic marks on all keyboards in 7-bit operations. Table 3-3 lists diacritic marks on all keyboards in 8-bit operations.

## Data Control Keys



Several keys are available to control the data displayed on the screen:

**[Back space]** Moves the cursor one character position backwards along the line, stopping at column 1 (see Page 2-18 for using it with a computer).

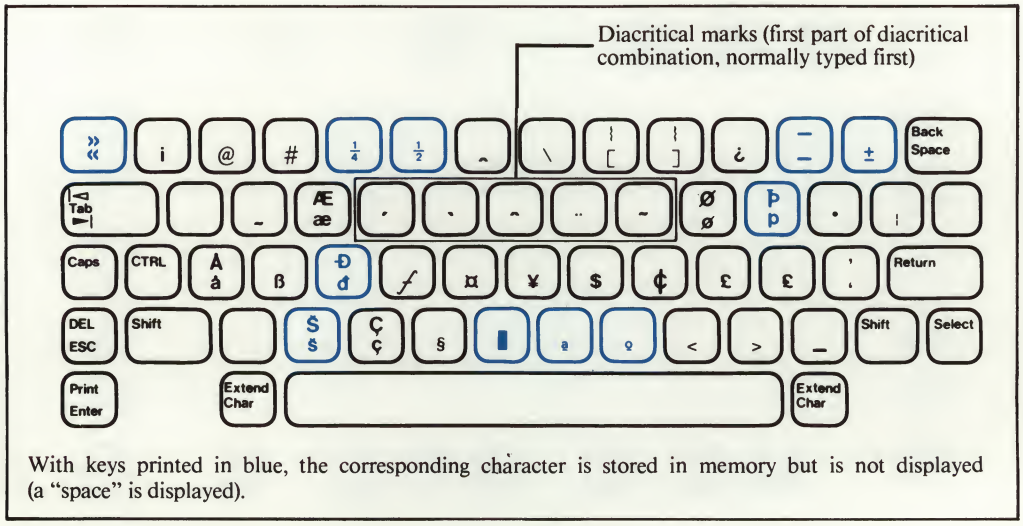



Figure 3-3. Correspondence Between Keys And Extended Characters Accessed Via **[Extend char]** Key (for all keyboards)

**[Caps]** Acts as a toggle switch, changing letters A to Z from lower-case to upper-case, and vice-versa (the other keys are not affected). When upper-case is selected, the message "CAPS" is displayed in the Status Line. The **[Shift]** key still remains active; when upper-case is selected using the **[Caps]** key, pressing **[Shift]** causes a shift to lower-case (and vice-versa). At power-on or after a hard reset the **[Caps]** key is de-activated.

Note that when the terminal is configured to use a USASCII keyboard, if the CAPS LOCK feature is selected in the Terminal Configuration Menu, the terminal is permanently set to upper-case (i.e. deactivating the **[Caps]** key); the character set group numeric keys, however, can still be shifted.

**[CTRL]** The CONTROL key has two functions:

1) Pressed simultaneously with an alphanumeric key, it may be used to access a set of "non-displayable" control characters, primarily used for terminal control applications (see the Reference Manual for details). For example **[CTRL]** with **[G]** generates control character BEL, which makes the terminal beep. These control characters can, however, be displayed symbolically when the terminal's Display Function mode is enabled (see Section 4).

2) Pressed simultaneously with the **[Shift]** and **[Reset Break]** keys it resets the terminal to the power-on state (see the Terminal Control Group). Pressed with **[Menu]** it displays the User Function Key Definition Menu. Pressed with **[User System]** it sets the function keys as user-defined keys (see the Function Key Group).

**[DEL ESC]** Pressed on its own = ESC, pressed with **[Shift]** = DEL.

1) ESC is used to generate the Escape control character. This character (followed by one or more alphanumeric characters) initiates terminal controls similar to those normally available to the computer; see the Reference Manual for details.
For example, to home up the cursor (left margin of first line), press **[ESC]** and then capital **[H]**.

2) DEL is used to generate the Delete character. In Local Mode, this character is displayed as "■". In Remote Mode, the displayed character and its use depends on the application program.

**[Print Enter]** Pressed on its own = ENTER, pressed with **[Shift]** = PRINT.

1) In Local Mode, ENTER or PRINT homes up the cursor (if memory lock is ON, home-up is below the last locked line) and causes a copy of all the data in display memory to be sent to the external printer. If the external device is not set as the "to" device (and the display is not set as the "to" device, see Section 4), an error message is displayed: "No "TO" device Press RETURN to clear", and the keyboard is locked until the **[Return]** (or **[Shift]** **[Reset Break]**) key is pressed. If only the display is set as the "to" device, the error message "Source-Destination Press RETURN to clear" is displayed. If a second port is not installed, no action is taken.

2) In Remote Mode, ENTER triggers a transfer of a copy of the displayed data to the computer; in Character Mode the current line, in Block Mode the current line or all the pages in memory, as configured (see Section 5).

If a computer is not connected: in Character Mode no action is taken; in Block Mode the keyboard may be locked (depending on the handshake, see the Reference Manual), and can be un-locked by pressing the **[Shift]** **[Reset Break]** keys.

PRINT homes up the cursor and copies all the data in display memory to the printer; if the printer is not set as the "to" device an error message is displayed (the same as for Local Mode). The <**device control**> screen labels also control the transfer of data to the printer (see Section 4).

3) When a Terminal/Datacomm/External Device Configuration Menu is displayed (in both Local and Remote Mode), ENTER or PRINT copies the menu to the printer. When the User Function Key Definition Menu is displayed, ENTER (in Remote Mode) sends a copy of the data in the mode, label and key fields to the computer; in Character Mode the current key, in Block Mode the current key or all keys, as configured. PRINT (or ENTER in Local Mode) copies all the menu to the printer. An error message is displayed if the printer is not set as the "to" device (the same as for Local Mode).

**[Extend char]** Used when the terminal is configured for 8-bit operations to "extend" the alphanumeric keys allowing them to access extended characters. That is it provides additional national characters and displaced ASCII characters not indicated on the keycaps. The correspondence between the alphanumeric keys and the extended characters is shown in Figure 3-3.

To generate an extended character, simultaneously press **[Extend char]** and the relevant alphanumeric key. Note that if the terminal is not configured for 8-bit operations ("None/8"in the Terminal's Datacomm Configuration Menu), the beeper sounds and no extended character is generated. On USASCII keyboard, the beeper also sounds and no extended character is generated if the "CapsLock" field in the Terminal Configuration Menu is set to "YES".

**[Return]** Normally generates the Carriage Return control character (but this may be changed using the Terminal's Configuration Menu, see Section 5). The Carriage Return character causes the cursor to be re-positioned in the left margin of the current line. In addition:

1) It stops a local copy all/copy page data transfer (at end of current line) to an external device.
2) If automatic line feed is enabled (see Page 2-15 and Section 4), the cursor is repositioned in the left margin of the next line.
3) In Remote Mode using Character Mode communications, the Carriage Return character may also be used to terminate the data transmission. However, automatic line feed should be disabled as the computer normally generates the line feed character.

**[Select]** Used to transmit the characters "Esc&P" over the datacomm (to the computer). How the computer interprets the character depends on the application program.

To use the select feature, move the cursor to the relevant position on the screen then press the **[Select]** key.

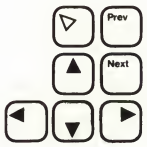
**[Shift]** Acts like the Shift key on a typewriter; when pressed simultaneously with a key, it causes the character indicated on the top-half of the keycap to be entered (this may be reversed on alphabetic keys using the **[Caps]** key). It can also shift some control keys in order to perform the control indicated in blue on the keycap; i.e. Reset, User, Tab|◄, DEL, and Print.

**|◄ [Tab] ►|**

Pressed on its own = TAB ►|, pressed with [**Shift**] = TAB |◄.

1) The tab stops are set via the margins/tabs/columns screen labels (see Page 2-11 and Section 4).
2) TAB ► moves the cursor right to the next tab stop on the current line, or to the left margin in the next line if no tab stop is encountered.
3) TAB ◄ moves the cursor to the left to the previous tab stop on the line, or to the left margin of the current line if no tab stop is encountered. If the cursor is currently in the first column, it is moved to the first encountered tab stop in the previous line.
4) In "forms mode" tab stops are ignored, and the [**Tab**] key moves the cursor from one unprotected field to another (see Page 4-3).

## CURSOR AND DISPLAY CONTROL GROUP




The screen can display 24 adjacent lines from the display memory (see Figure 3-4). This group of keys controls the position of the cursor and the movement of displayed data up and down the screen, and contains the following keys:

**[▽]**

Pressed on its own = HOME UP, pressed with [**Shift**] = HOME DOWN.

1) HOME UP moves the cursor to the left margin of the first "non-locked" line, rolling text down as required. The left margin can be altered using the <**margins/tabs/col**> screen label (see Page 2-10 and Section 4), and the "first non-locked line" is the next free line after those locked using the <**MEMORY LOCK**> label (described in Section 4).
2) HOME DOWN moves the cursor to the left margin in line below the last "non-locked" line, rolling text up the screen as required.

**[▲]**

Pressed on its own = CURSOR UP, pressed with [**Shift**] = ROLL UP.

1) CURSOR UP moves the cursor up the screen one line at a time. When the cursor reaches the top of the screen, it re-appears at the bottom.
2) ROLL UP scrolls the "non-locked" lines of the display memory up the screen (and under any locked lines) until the last line, which remains displayed at the top of the screen; see Figure 3-4. Lines locked on the screen using the <**MEMORY LOCK**> label cannot be rolled up or down. You can set the terminal to smooth scroll ("even" flow of displayed data) or normal scroll ("jumps" a line at a time) using the <**SMOOTH SCROLL**> screen label (see Section 4).

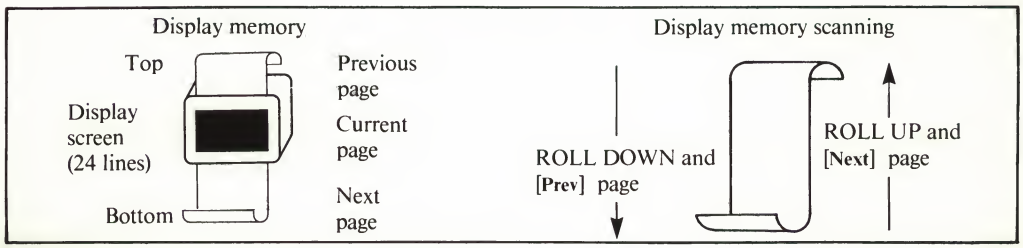



Figure 3-4. Scanning The Display Memory

[▼] Pressed on its own = CURSOR DOWN, pressed with [**Shift**] = ROLL DOWN.
1) CURSOR DOWN moves the cursor down the screen one line at a time. When the cursor reaches the bottom of the screen, it re-appears at the top.

2) ROLL DOWN scrolls the "non-locked" lines of the display memory down the screen. If the first line on the screen is the first line in the memory, no roll down is performed (as the roll down key cannot be used to create new lines at the top of the memory). Lines locked on the screen using the <**MEMORY LOCK**> label cannot be rolled down. The <**SMOOTH SCROLL**> screen label sets the terminal to jump scroll or smooth scroll (see Section 4).

[►] Moves the cursor to the RIGHT one character position at a time. When the cursor reaches the 80th column (right most) it re-appears in column 1 (left most) of the next line.

[◄] Moves the cursor to the LEFT. When the cursor reaches column 1 it re-appears in column 80 of the previous line.

[**Next**] Scans the display memory forward, causing the currently displayed page (non-locked lines) to be replaced by the NEXT page (see Figure 3-4). Holding the key down repeats the operation until the last line in display memory appears at the top of the screen. Lines locked on screen using <**MEMORY LOCK**> are not affected.

[**Prev**] Causes the PREVIOUS page (non-locked lines) of display memory to be displayed. Holding the key down repeats the operation until the first line of display memory appears at the top of the screen.

## NUMERIC GROUP

The numeric keys are at the right-hand side of the keyboard. These keys are arranged to simplify the entry of numeric data, "period" (decimal point), asterisk, slash, plus sign, minus sign (hyphen), comma, the use of tabs, and the [**Enter**] key.

## EDIT GROUP

The edit keys may be used to modify the data displayed on the screen as follows:

[**Clear line**] Clears the line from the current cursor position to the end of the line.

[**Clear display**] Clears all the display memory (and screen) from the current cursor position to the end of the memory.

[**Insert line**] Inserts a new blank line above the current line, and moves the cursor to the left margin of the new line. The line that previously contained the cursor (and subsequent lines) are moved down the screen. When the display memory is full, inserting a new line causes an existing line in the memory to be lost (deleted); this is normally the first line in the memory but if it is being displayed, the last line is lost.

**[Delete line]** Deletes the line containing the cursor, and moves the cursor to the left margin. All subsequent lines are moved up the screen.

**[Insert char]** Toggles ON/OFF insert character mode. When ON, causes the symbol "Ins Char" to be displayed in the Status Line. Entered characters are then inserted in the line at the cursor position (without overwriting existing characters), and the cursor and remaining characters in the line move to the right margin. Characters overflowing the right margin are lost.

**[Delete char]** Deletes the character at the current cursor position, and moves the remaining characters on the line to the left.

## TERMINAL CONTROL GROUP


The terminal control keys are used to interrupt terminal-to-computer communications, and initialize the terminal as follows:

**[Stop]** In Remote Mode, acts as an ON/OFF toggle switch to temporarily halt (then start) the flow of data from the terminal's datacomm buffer (data received from the computer) to the screen. This allows received data to be displayed on the screen in short passages for checking purposes. When ON, the symbol "STOP" appears in the Status Line. **[Stop]** has no effect in Local Mode.

NOTE

This key will only operate when the X-ON/X-OFF receive pacing handshake is enabled in the Datacomm Configuration Menu. This prevents a datacomm buffer overflow (as the **[Stop]** key only has a local action). See the Reference Manual for details.

**[Reset Break]** Pressed on its own = BREAK, pressed with **[Shift]** = SOFT RESET, pressed with **[Shift]** and **[CTRL]** = HARD RESET.

1) In Local Mode, BREAK has no action. In Remote Mode, BREAK may be used to interrupt the terminal-to-computer data communications (by setting the datacomm to the low state for 200 milliseconds); this is also known as a system BREAK. The computer's response depends on the application program.

NOTE

A system BREAK normally causes the computer to exit the current application program and return to the main program, which may cause loss of data if a data transfer is in progress.

2) SOFT RESET makes the terminal beep, unlocks the keyboard, clears any error messages, deactivates Display Function Mode and Record Mode, stops any terminal operations currently in progress, stops datacomm and/or printer data transfers, clears the datacomm buffer, and displays the previous screen labels.

NOTE

If the computer is sending data when you perform a SOFT RESET, some loss of data may occur.

3) A HARD RESET is similar to power-on, except that a self test is not performed. It causes a soft reset and clears the display memory (and screen), resets the left/right margin to column 1 and 80 respectively, clears all tab stops (except implicit stop in left margin), and deactivates: Insert Character Mode, Line Modify Mode, Smooth Scroll, Memory Lock, [**Caps**] key and top/bottom logging. It also reinitializes the configuration menu parameters to their power-on (saved) setting, and sets the labels to the MODES level. User-defined keys/labels retain their pre-reset values (they are reset to their default values by a hard reset from the computer).

NOTE

In Remote Mode, a HARD RESET causes the loss of the terminal's configuration parameters temporarily set by the host computer. This may cause communication difficulties, the loss of data received from the computer, and interrupt communications.

## FUNCTION KEY GROUP


The eight function keys [**f1**] to [**f8**] at the top of the keyboard perform the functions indicated by the corresponding labels at the bottom of the screen. [**f1**] controls the left-most label, and [**f8**] the right-most. The two function control keys [**Menu**] and [**User System**] are used to select the type of information contained in the screen labels. This allows the function keys to be operated as pre-set terminal control keys or user-defined keys.

[**User System**] Pressed on its own = SYSTEM (function keys as pre-set terminal control keys). Pressed with [**Shift**] or pressed with [**CTRL**] = USER (function keys as user-defined keys).

1) SYSTEM allows access to five sets of function labels, where each set assigns specific terminal controls to the eight labels/function keys (see the labels tree on the inside of the rear cover). Pressing [**User System**] returns the labels to primary level (SYSTEM), which are:
   - <**device control**> – used to control an external printer (only displayed if terminal equipped with second port).
   - <**margins/tabs/col**> – used to control screen margins, tabs and the start column.
   - <**service keys**> – used to test the terminal.
   - <**modes**> – used to access terminal control modes.
   - <**config keys**> – used to configure the terminal.

   Pressing a function key ([**f1**] to [**f8**]) selects the function indicated by the associated label. The screen labels that are in lower-case letters are used to access a sub-set of labels. The screen labels in CAPITAL letters are used to control the function indicated by the label. The function key toggles the specified function ON and OFF. When a function is ON an asterisk (*) appears in the associated label. For more detailed information on the pre-set controls, refer to Section 4.

2) USER causes the function keys to operate as defined in the User Function Key Definition Menu (described in the [**Menu**] key below). The screen labels contain the information defined by the user, and the function keys generate (in the current line) the characters defined by the user.

[**Menu**] Pressed on its own = toggle ON/OFF the screen labels and Status Line and set function keys as user-defined keys, pressed with [**CTRL**] = User Function Key Definition Menu.

1) Pressing [**Menu**] once switches OFF the screen labels and Status Line, and sets the function keys to operate as user defined keys (see (2) below). Pressing the [**Menu**] key again switches ON the Status Line and the user-defined screen labels (and leaves the keys operating as user-defined keys). This is equivalent to pressing [**Shift**] [**User System**] or [**CTRL**] [**User System**].

2) The User Function Key Definition Menu lets you specify the information contained in the screen labels and function keys. This allows you to enter frequently used data with only one keystroke. By default, the user-defined labels are <**f1**> to <**f8**>, and the function keys generate and transmit characters Esc p to Esc w. To change a parameter, simply display the menu (see Figure 3-5), then place the cursor in the relevant portion of the screen and make the desired change using:

- Menu labels <**NEXT CHOICE**> and <**PREVIOUS CHOICE**> when the cursor is in the first "operating mode" field to select how the data contained in the key is to be treated:

  L = Locally executed on the terminal.

  T = Transmitted to the computer. The data is automatically "terminated"; that is, it acts as if you also pressed the [**Return**] key (in Character Moded) or [**Enter**] key (in Block Mode). The data is only displayed if echoed by the computer.

  N = Normal (acts as if the data was entered from the keyboard). In Remote Mode you must terminate the data using the [**Return**] or [**Enter**] key. If required, in Character Mode a "$_{CR}$" character may be appended to the data to automatically terminate it.

- The keyboard's alphanumeric keys to specify the content of the labels, in two lines of up to 8 characters (i.e. up to 16 characters per label); and the data contained in the function key, up to 80 characters per key. For these fields, the menu label <**DISPLAY FUNCTIONS**> allows terminal control characters to be entered (and displayed symbolically). Consequently, alphanumeric characters, control characters and escape sequences can be included. However, when the menu is displayed the alternate character set and display enhancements are inhibited (e.g. a line element cannot be displayed in the menu). Note that the [**Print Enter**] key operates "normally" (even when DISPLAY FUNCTIONS is on), which allows the menu to be printed on the external device, see Page 3-7.
- Menu label <**DEFAULT VALUES**> to return all the labels and function keys to their default setting (regardless of the cursor position), and moves cursor to the first "operation mode" field.

Exit the menu using the [**User System**] or [**Menu**] key. The definitions (defined locally or from the computer) are automatically retained in the terminal's non-volatile memory, and are saved after the terminal is powered OFF/ON

or a hard reset is performed locally. The definitions are replaced by the default values after a hard reset from the computer.

NOTE

When the User Function Key Definition Menu is displayed, all the keys operate "locally" (except **[Shift]**, **[Print Enter]**, **[Reset Break]** and **[Stop]** which operate "normally"). Note that the edit operation of the **[Insert char]**, **[Delete char]** and **[Clear line]** keys only affects the field containing the cursor (the text movement/editing operation of the **[Next]**, **[Prev]**, **[Insert Line]**, **[Delete line]** and **[Clear display]** keys is inhibited). In addition, locally entered data and Escape sequences are processed, but incoming displayable data (from the computer) causes the screen to return to normal operations and the data to be displayed.

For example, to set label <f7> to [A play] and to set function key **[f7]** to locally generate the text "Julius Caesar – play by William Shakespeare written circa 1599": press keys **[CTRL]** and **[Menu]** (to display the User Function Key Definition Menu). Enter the data in the menu and set key **[f7]** to local operation as shown in Figure 3-5. To use the key/label definition, press keys **[Shift]** **[User System]** (to display the user labels), and note that label <f7> is marked "A play". Then press key **[f7]** to display, in the current line, the text "Julius Caesar...".

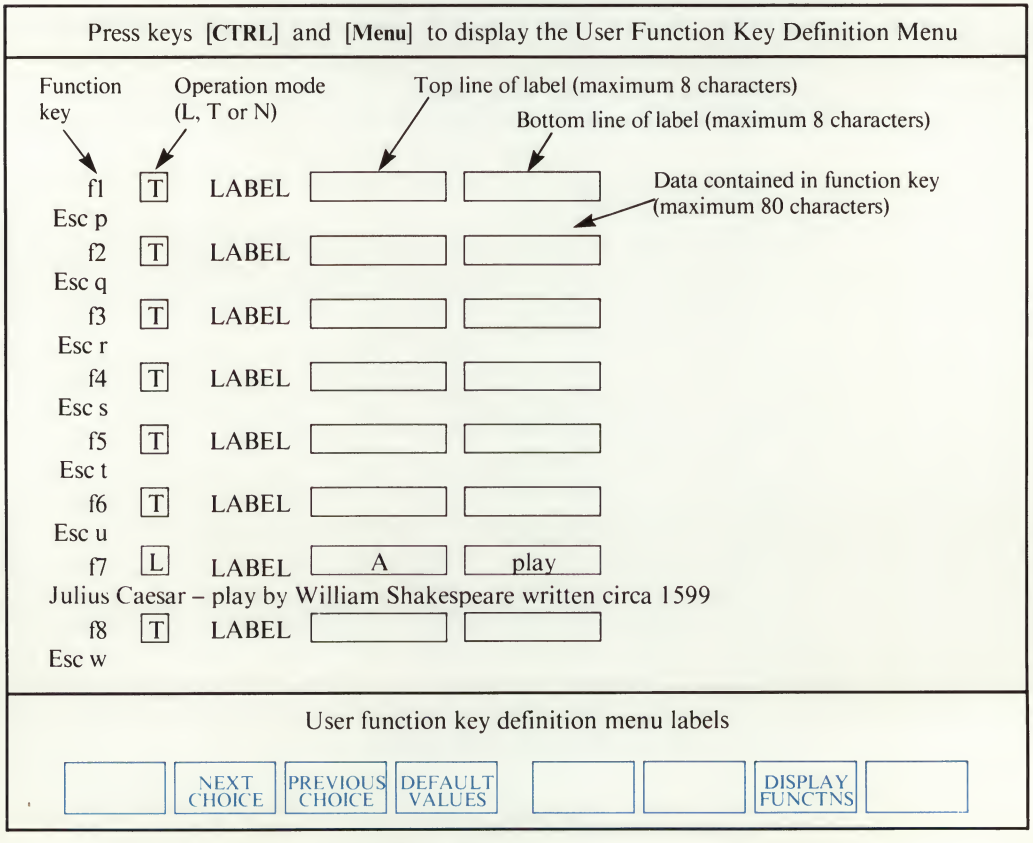



Figure 3-5. User Function Key Definition Menu

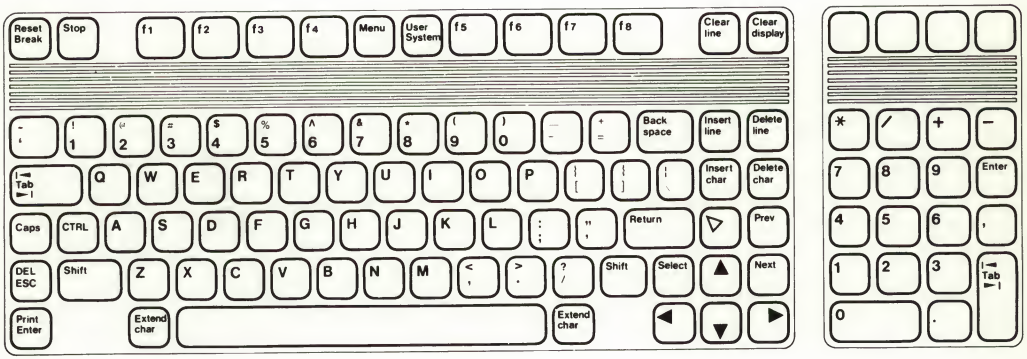



Figure 3-6. American USASCII Keyboard (standard) "USASCII"

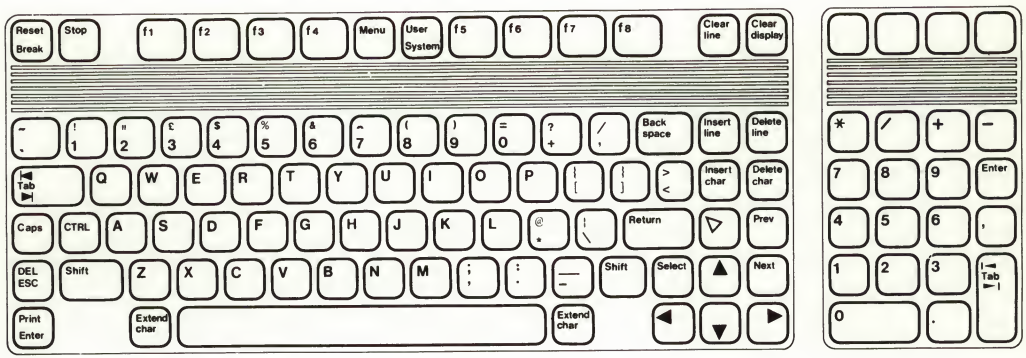



Figure 3-7. English (UK) Keyboard (option 105) "UK"

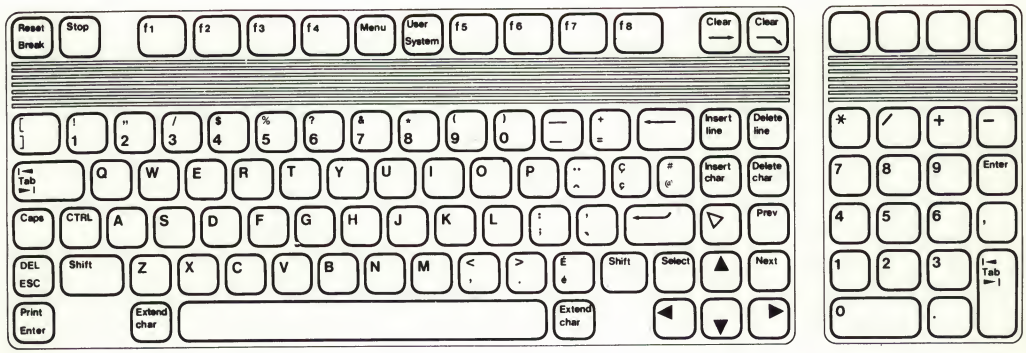



Figure 3-8. Canadian (English) Keyboard (option 108) "ENGLISH CANADIAN"

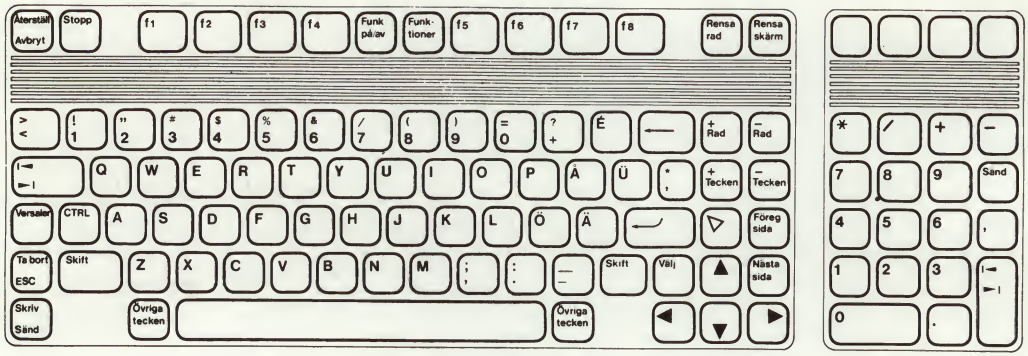



Figure 3-9. Swedish Keyboard (option 101) "SVENSK"

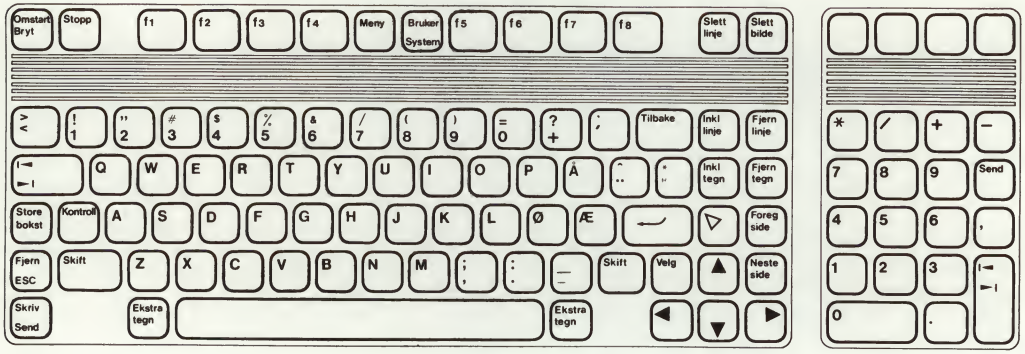



Figure 3-10. Norwegian Keyboard (option 102) "NORSK"

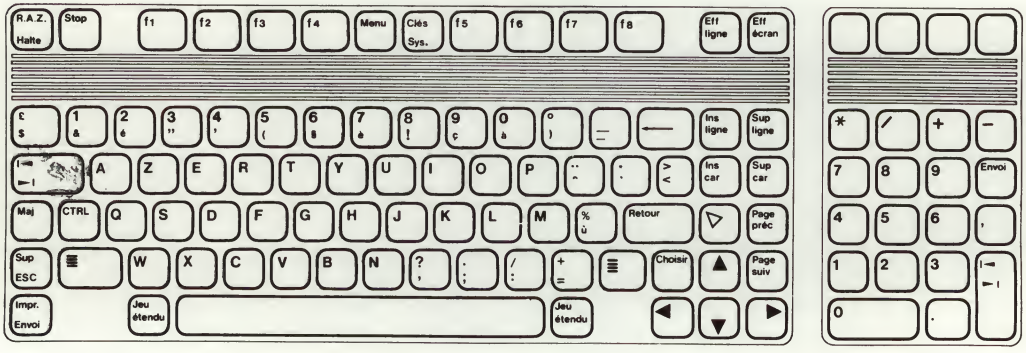



Figure 3-11. French Keyboard (option 103) "FRANÇAIS"

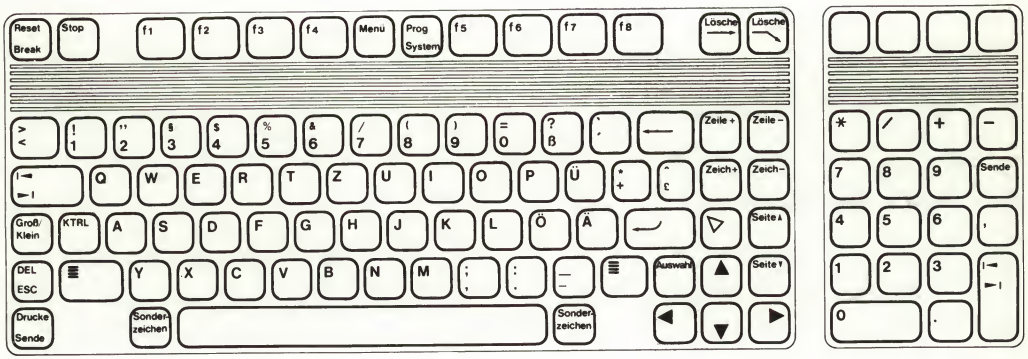



Figure 3-12. German Keyboard (option 104) "DEUTSCH"

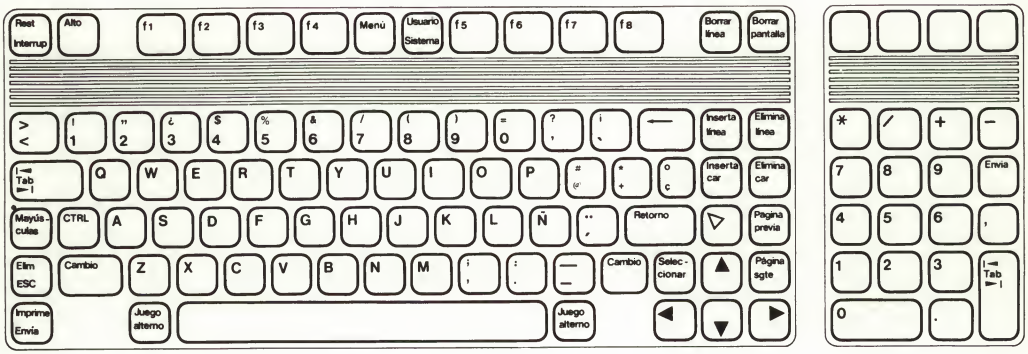



Figure 3-13. Spanish (European) Keyboard (option 106) "ESPAÑOL EUR."

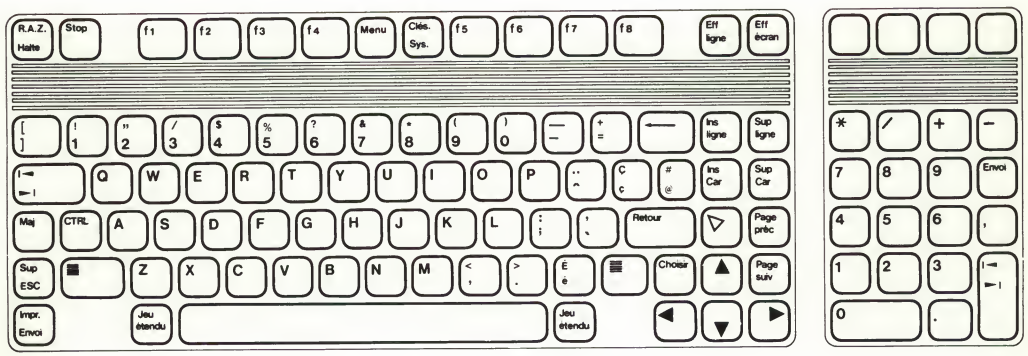



Figure 3-14. Canadian (French) Keyboard (option 107) "CANADIEN FRANÇAIS"

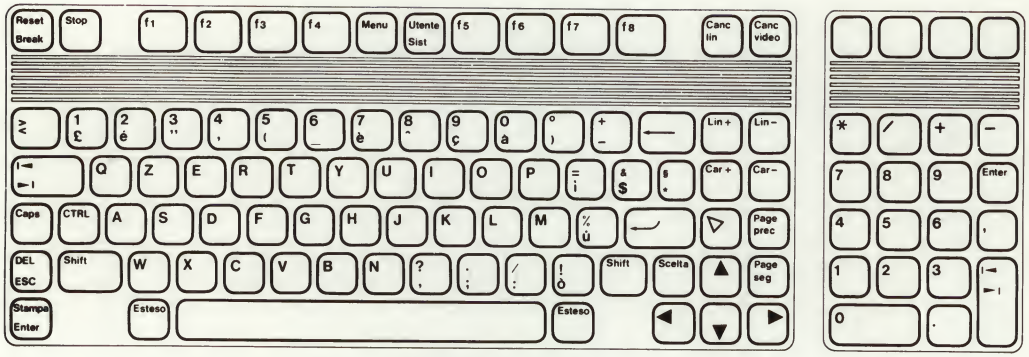



Figure 3-15. Italian Keyboard (option 109) "ITALIANA"

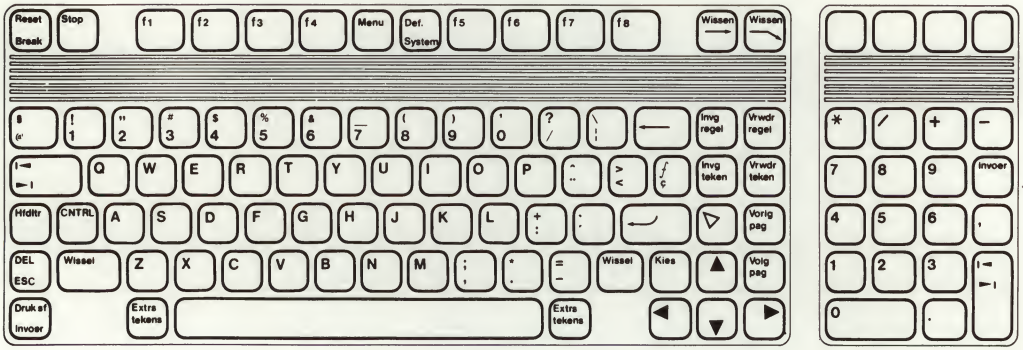



Figure 3-16. Dutch Keyboard (option 110) "NEDERLANDS"

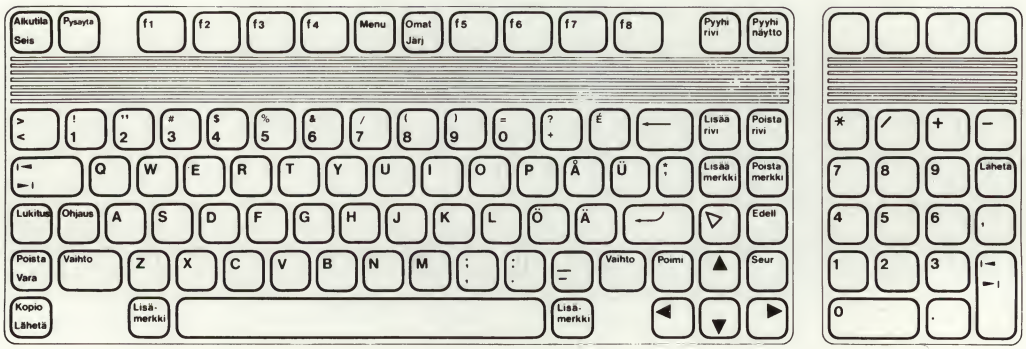



Figure 3-17. Finnish Keyboard (option 111) "SUOMI"

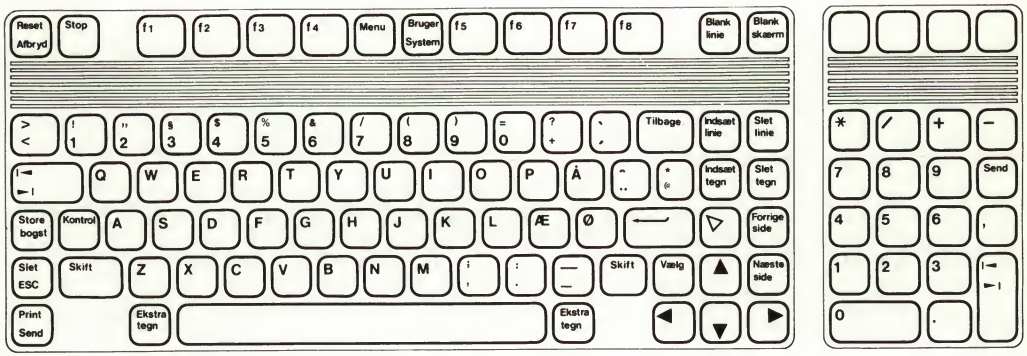



Figure 3-18. Danish Keyboard (option 112) "DANSK"

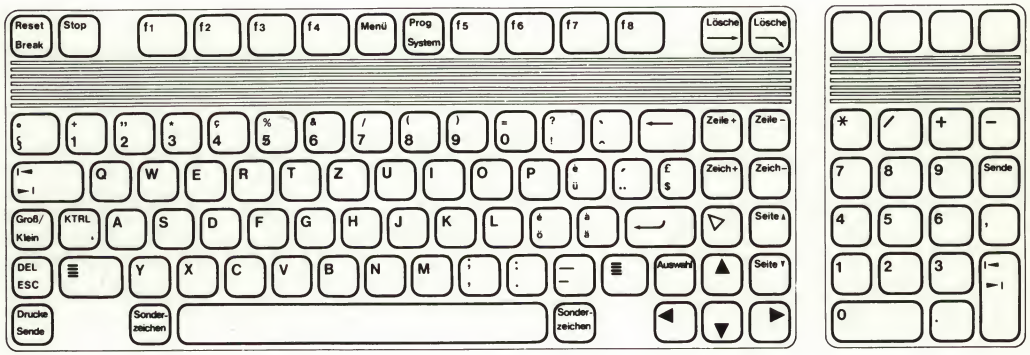



Figure 3-19. Swiss (German) Keyboard (option 113) "SCHWEIZ-DEUTSCH"

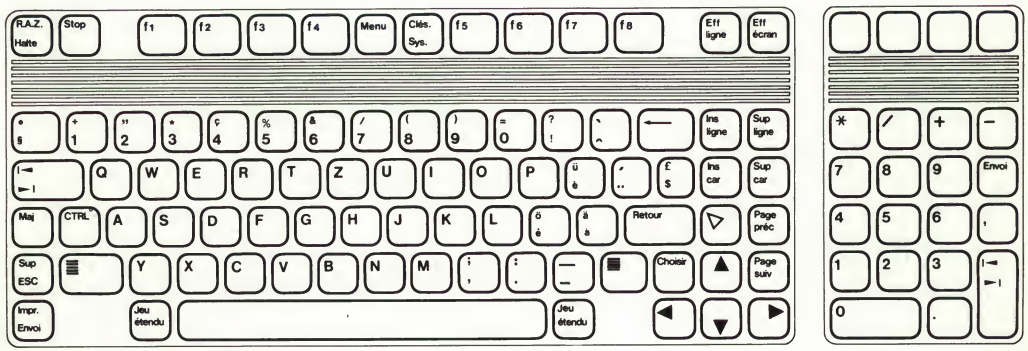



Figure 3-20. Swiss (French) Keyboard (option 114) "SUISSE ROMAN"

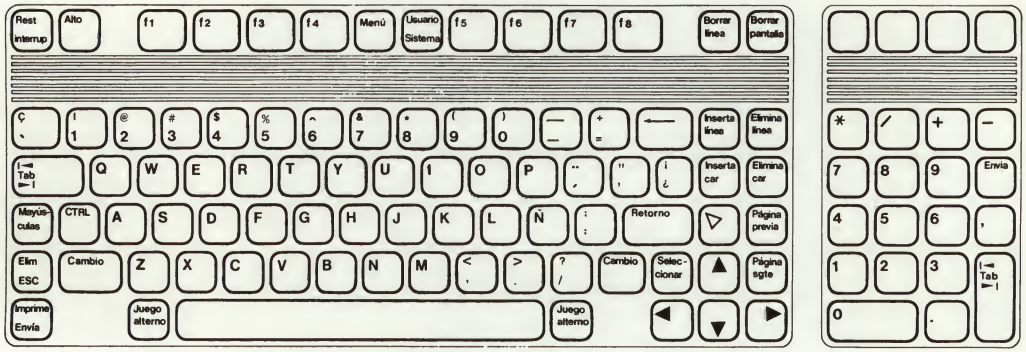



Figure 3-21. Spanish (Latin American) Keyboard (option 115) "ESPAÑOL LAT."

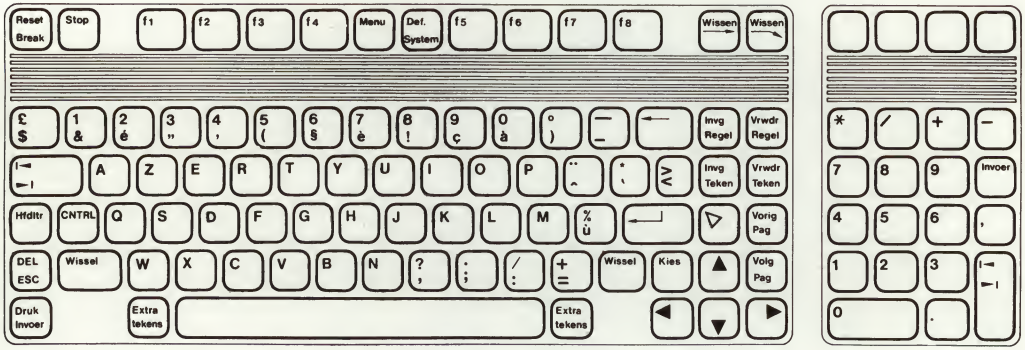



Figure 3-22. Flemish Keyboard (option 116) "VLAAMS"

Table 3-2 lists the USASCII characters replaced by national characters on the national keyboards. Note that when the terminal is configured for 7-bit operations (that is the "Parity/DataBits" field in the Datacomm Configuration Menu set to one parity bit and seven data bits), these national characters should be used to access the indicated line drawing elements. However,

Table 3-2. USASCII Characters Replaced By National Characters On National Keyboards (7-bit operations)

| KEYBOARDS | CHARACTERS | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| USASCII | # | ' | < | > | @ | [ | \ | ] | ^ | ` | { | \| | } | ~ |
| Danish | § | ´ | < | > | @ | Æ | Ø | Å | ^ | ` | æ | ø | å | ¨ |
| Dutch | # | ' | < | > | @ | ç | \ | § | ^ | ` | *f* | \| | ´ | ¨ |
| Finnish | # | ' | < | > | É | Ä | Ö | Å | Ü | é | ä | ö | å | ü |
| Flemish and French | £ | ' | < | > | à | ° | ç | § | ^* | ` | é | ù | è | ¨* |
| English Canadian and French Canadian | # | ' | < | > | @ | [ | ç | ] | ^ | ` | é | Ç | É | ¨ |
| French Swiss and German Swiss | £ | ´ | é | è | à | ° | ç | § | ^ | ` | ä | ö | ü | ¨ |
| German | £ | ' | < | > | § | Ä | Ö | Ü | ^ | ` | ä | ö | ü | ß |
| Italian | £ | ' | < | > | § | ° | ç | é | ^ | ù | à | ò | è | ì |
| Norwegian | # | ´ | < | > | @ | Æ | Ø | Å | ^ | ` | æ | ø | å | ¨ |
| European Spanish | # | ´* | < | > | @ | ¡ | Ñ | ¿ | ° | `* | ' | ñ | ç | ¨* |
| Latin Spanish | # | ´* | < | > | @ | ¡ | Ñ | ¿ | ^ | `* | ' | ñ | ç | ¨* |
| Swedish | # | ' | < | > | É | Ä | Ö | Å | Ü | é | ä | ö | å | ü |
| U.K. | £ | ' | < | > | @ | [ | \ | ] | ^ | ` | { | \| | } | ~ |
| Line Drawing Elements | ┳ | ┯ | ╪ | ╪ | ┣ | ┫ | ·· | ╨ | · | ┣ | ┫ | ·· | ╨ | · |

Note: In 7-bit operations, characters marked by a "*" are diacritical marks. (See Table 3-3 for diacritical marks in 8-bit operations).

when the terminal is configured for 8-bit operations (that is the "Parity/DataBits" field set to "None/8"), the USASCII characters shown in Figure 3-2 must be used to access the line drawing elements; USASCII characters that do not appear on the keyboard must be accessed using the **[Extend char]** key (see Figure 3-3).

Table 3-3. Diacritical Marks In 8-bit Operation

| KEYBOARDS | DIACRITIC MARKS |
|---|---|
| USASCII | None |
| Danish | ´ ` ¨ |
| Dutch | ´ ^ ` ¨ |
| Finnish | None |
| Flemish and French | ^ ¨ |
| English Canadian and French Canadian | ^ ` ¨ |
| French Swiss and German Swiss | ´ ^ ` ¨ |
| German | None |
| Italian | ^ |
| Norwegian | ´ ` ¨ |
| European Spanish | ´ ` ¨ |
| Latin Spanish | ´ ` ¨ |
| Swedish | None |
| U. K. | None |
| **[Extend char]** Key | ´ ^ ` ¨ ~ |

# The Display Screen — SECTION 4

## Contents



## Illustrations

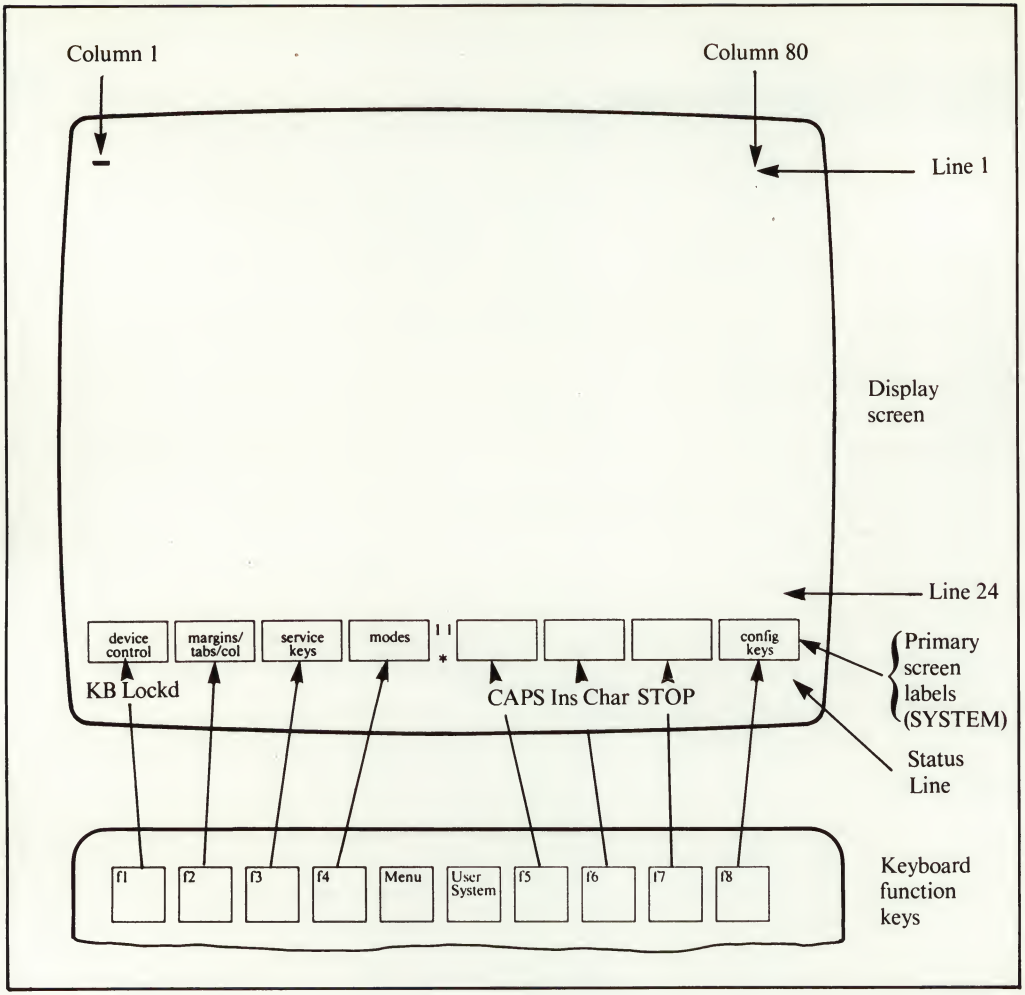



Figure 4-1. The Screen

1) Press **[User System]** key to display the SYSTEM labels:

| device control | margins/ tabs/col | service keys | modes | | | | config keys |
|---|---|---|---|---|---|---|---|

2) Then press a function key (**[f1]**, **[f2]**, **[f3]**, **[f4]** or **[f8]**) to access the terminal function shown in the label. As new labels appear, the terminal function shown in the label is accessed using keys **[f1]** to **[f8]**.

Figure 4-2. How To Use The Screen Labels

# The Display Screen SECTION 4

## THE SCREEN

The display screen contains 27 lines. You use the first 24 to display entered data (up to 80 characters per line). The three bottom lines are reserved for the terminal's use: the 25th and 26th display the function key labels (and also error messages), and the 27th is the Status Line.

## DISPLAY MEMORY

The standard terminal stores up to four pages of data (96 lines) in display memory. When you use display enhancements, the terminal stores a minimum of two pages (48 lines); with security attributes (and display enhancements) on each line, one-and-a-half pages (36 lines) of storage are available. If the terminal has the optional memory extension, it stores (on average) up to eight pages of data (144 lines). It stores a minimum of four pages (96 lines) when using display enhancements, and three-and-a-half pages (84 lines) with security attributes (and display enhancements) on each line.

## DISPLAY ENHANCEMENTS

You can enhance the screen display on a character-by-character basis with half-bright, underline, inverse video and blinking (in any combination). You can also define security fields, in which data entered in the display memory does not appear on the screen. The Reference Manual describes the Escape sequences used to program these enhancements from the host computer. From the keyboard, you can enter the same escape sequences to activate or deactivate a particular enhancement (see Page 2-6). When you select an enhancement, each new character you type on that line is enhanced accordingly. Enhancements are automatically deactivated when the cursor enters a new line. Note that when the display memory is full, activating a display enhancement may cause existing data in memory to be lost. This is normally the first line in memory, but if it is being displayed the last line is lost.

### **Forms Mode** (Format Mode)

Forms mode allows forms to be created by designating areas of the screen as protected and unprotected fields. The mode and the fields are programmed by Escape sequences from the host computer (see the Reference Manual).

You can enter data only in the unprotected fields. The edit operation of the **[Insert char]**, **[Delete char]** and **[Clear line]** keys only affects the field containing the cursor (the editing operation of the **[Insert line]** and **[Delete line]** keys is inhibited). The **[Clear display]** key clears all the data in all subsequent unprotected fields. A protected field cannot be overwritten by data either entered from the keyboard or received from the host computer. If you press a character key while the cursor is in a protected field, the terminal automatically advances the cursor to the next unprotected field before accepting the character. The terminal also advances the cursor to the next unprotected field when you press the **[Tab]** key, or when you enter a character in the last character position in the current unprotected field. **[Shift]** **[Tab]** moves the cursor to the start of the unprotected field, or to the start of the previous unprotected field if the cursor was in the first character position.

The operation of Forms Mode varies according to the application program used.

## STATUS LINE

The bottom line of the screen displays the following terminal status information:

**KB Lockd** Keyboard locked; no data can be entered. This occurs:

1) During a data transfer to the computer.
2) When awaiting a confirmatory "handshake" from the computer after pressing the **[Enter]**, **[Select]** or "transmit" user key (when Terminal Configuration Menu fields "InhHndShk (G)" and "InhDC2 (H)" are set to "YES" and "NO" respectively, see the Reference Manual).
3) When the terminal is in Record Mode (see Page 2-15).
4) When a lock-keyboard instruction is received from a program running in the host computer. e.g. under certain circumstances when sending data over an X.25 network.

Only keys **[Shift]**, **[CTRL]** and **[Reset Break]** function (when an error message is displayed, only these keys and **[Return]** function).

* Modem indicator showing the modem is active. The "asterisk" parameter in the Datacomm Configuration Menu controls the "*" (see section 5).

**CAPS** Keyboard set to capitals using **[Caps]** key.

**Ins Char** **[Insert char]** key active indicator.

**STOP** **[Stop]** key active indicator (indicates flow of data from computer to screen temporarily halted, see Page 3-11 for details).

## SCREEN LABELS (function keys)

Screen labels are displayed in half-bright inverse video at the bottom of the screen. These labels indicate the operation of the function keys **[f1]** to **[f8]** at the top of the keyboard, see Figure 4-1. The labels tree inside of the rear cover shows the available labels. Two keys, **[Menu]** and **[User System]**, control access to keys **[f1]** to **[f8]** as follows:

1) **[Menu]** switches OFF/ON the labels and Status Line, and sets function keys as user-defined keys (see (3) below).
2) **[CTRL]** with **[Menu]** displays the user function key definition menu.
3) **[Shift]** with **[User System]** (or **[CTRL]** with **[User System]**) displays the user-defined labels, and sets keys **[f1]** to **[f8]** to operate as specified in the User Function Key Definition Menu.

(See Section 3 for details)

4) **[User System]** displays the primary level (SYSTEM) of the pre-set terminal control labels. The label sets are described in the rest of this section.

### Terminal Control Labels

All the terminal controls displayed in the screen labels are accessed using function keys **[f1]** to **[f8]**. Pressing a key selects the mode/function indicated by the associated label. Blank labels indicate the corresponding function keys are inactive. Labels in lower-case letters access a sub-set of labels. Labels in CAPITAL letters control the mode/function indicated by the label. The function key toggles the specified mode/function ON and OFF. When a mode is ON an asterisk (*) appears in the associated label. Pressing the **[User System]** key always returns the labels to the SYSTEM level.

The remainder of this section describes the sets of function labels in the order of the labels tree illustration inside the rear cover.

## SYSTEM Labels


| LABEL | FUNCTION (SYSTEM) |
|---|---|
| <**device control**> | Displays first of two sets of labels controlling external device (label NOT displayed if terminal does NOT have two ports). |
| <**margins/ tabs/col**> | Displays the labels controlling the margins, tabs, and selecting the start column (for data transmissions to the computer). |
| <**service keys**> | Displays labels used to perform terminal self tests. |
| <**modes**> | Displays labels controlling terminal's main operating modes. |
| <**config keys**> | Displays labels used to access datacomm, external device, and terminal configuration menus. |

<**device control**> Labels (only displayed if terminal has two ports).


| LABEL | FUNCTION (DEVICE CONTROL, first set of device labels) | |
|---|---|---|
| <**device modes**> | Displays second of two sets of labels controlling external device (see <**device modes**> labels). | |
| <**TO EXT DEV***> | Sets external device (printer) as "to" device for data entered on keyboard and/or received from computer. | One or both may be active (* in label). If neither active, displayable data from computer may be lost. |
| <**TO DISPLAY***> | Sets terminal display as "to" device for data received from the computer in Record Mode. | |
| | If external device set as "to" device: | If only display set as "to" device:<br><br>Terminal ignores request and displays error message:<br>Source = Destination<br>Press RETURN to clear<br><br>If neither display nor device set as "to" device:<br>Terminal ignores request and displays error message:<br>No "TO" device<br>Press RETURN to clear |
| <**ADVANCE PAGE**> | Advances paper in external device by one (blank) page. | |
| <**ADVANCE LINE**> | Advances paper in external device by one (blank) line. | |
| <**COPY ALL**> | Copies to external device data in memory (line containing cursor to end of memory). | |
| <**COPY PAGE**> | Copies to external device data on screen (line containing cursor to end of page). | |
| <**COPY LINE**> | Copies to external device data in line containing the cursor. | |

Note: 1) COPY PAGE and COPY ALL can be stopped at end of line by pressing the [**Return**] key.
2) Keys [**Print**] or [**Enter**] in Local Mode and [**Print**] In Remote Mode copy all data in memory to device (from cursor home-up to end of memory).
3) Keys [**Print**] or [**Enter**] can be used to copy a Datacomm Configuration Menu or Function Key definition Menu to the external device (refer to Page 2-22 for more information).

<device modes> Labels (only displayed if terminal has two ports)


| LABEL | FUNCTION (DEVICE MODES, second set of device labels) |
|---|---|
| <device control> | Displays first of two sets of labels controlling the external device (see <device control> labels). |
| <RECORD MODE*> | Activates/deactivates Record Mode; this mode only operates when the terminal is in Remote Mode as it causes computer data to be sent in blocks (of up to 256 characters) from the datacomm buffer to the "to" device (printer and/or display set by <device control> labels, see Page 2-15). |
| <LOG BOTTOM*> | Activates/deactivates Log Bottom Mode (deactivates Log Top Mode), which causes current line to be copied to external device when cursor moves to a new line (e.g. when cursor wraps round or [Return] pressed). |
| <LOG TOP*> | Activates/deactivates Log Top Mode (deactivates Log Bottom Mode), which causes line rolling off the top of the display memory (when the memory is full) to be copied to the external device. If overflow protect is active (see <MEMORY LOCK> label), LOG TOP is inhibited. |
| Note: A device (the display and/or external device) MUST be set as the "to" device using the <device control> labels. If no "to" device exists, when the data transfer is attempted (in Local Mode), the following error message is displayed: No "TO" device Press RETURN to clear (refer to Page 2-22 for details). | |

<margins/tabs/col> Labels


| LABEL | FUNCTION (SCREEN MARGINS, TABS AND START COLUMN) |
|---|---|
| <START COLUMN> | Sets the start column for data transfers to computer using labels <LINE MODIFY> and <MODIFY ALL> (see <modes> labels). The default start column is set in the Terminal Configuration Menu (see Section 5). |
| <SET TAB> | Sets a tab stop in column containing the cursor. Any number of tabs can be set per line (up to 79), the cursor skips to tab stop using the [Tab] key. (Tab stops are ignored in "forms mode"). |
| <CLEAR TAB> | Clears the tab stop from the column containing the cursor. |
| <CLR ALL TABS> | Clears all the tab stops set using <SET TAB> label (in all columns except implicit stop at left margin). |
| <LEFT MARGIN> | Sets screen left margin in column containing the cursor (cursor moves to a left margin when cursor wraps round or [Return] key pressed). |
| <RIGHT MARGIN> | Sets screen right margin in column containing the cursor. The right margin cannot be set to the left of the left margin (and vice-versa), if attempted the beeper sounds and the terminal ignores the request. |
| <CLR ALL MARGINS> | Clears ALL the margins set by the user (resetting left margin to column 1 and right margin to column 80). |

<service keys> Labels


| LABEL | FUNCTION (SERVICE KEYS, see Section 6 for details) |
|---|---|
| <TERMINAL TEST> | Causes terminal to perform a self-test lasting approximately 2 seconds (see Section 6 for details). [Shift] [f5] starts continuous self-test, which is stopped by repressing [f5]. |
| <IDENTIFY ROMS> | Displays a list of the ROMs installed in terminal, supplying their part numbers (see Section 6). |
| <PORT 1 TEST> | Initiates port 1's data communications test. The port must be equipped with a test connector (see Section 6). [Shift] [f7] starts continuous port 1 test, which is stopped by repressing [f7]. |
| <PORT 2 TEST> | Label only displayed when terminal equipped with a Datacomm module (port 2). Initiates port 2's data communication test (similar to port 1 test). [Shift] [f8] starts continuous port 2 test, which is stopped by repressing [f8]. |
| Note: An asterisk only appears in labels <TERMINAL TEST>, <PORT 1 TEST> and <PORT 2 TEST> when the continuous test is initiated (key simultaneously pressed with [Shift] ). | |

<modes> Labels


| LABEL | FUNCTION (MODES) |
|---|---|
| <LINE MODIFY*> | Activates/deactivates Line Modify Mode (also deactivated by [Enter] or [Return] keys). This mode is used in Remote Mode with Character Mode data tansfers to correct a line of text, without having to re-type the complete line (see Page 2-17). When active it allows the line of text containing the cursor to be corrected and transmitted to the computer as a block when the [Return] or [Enter] key is pressed. The start column for the transfer can be set using the <START COL> label (see <margins/tabs/col> label). |
| <MODIFY ALL*> | Activates/deactivates Modify All Mode. This mode is similar to Line Modify mode, except it is not deactivated by the [Return] or [Enter] key but only by pressing [f2] <MODIFY ALL> again (see Page 2-17). |
| <BLOCK MODE*> | Toggles between Block Mode (asterisk) and Character Mode (no asterisk) Remote Mode communications; see "Terms Used In This Manual". The setting is retained in non-volatile memory. In Block Mode the size of the block transmitted to the computer must be set in the Terminal Configuration Menu (see Section 5). |
| <REMOTE MODE*> | Toggles terminal between Remote Mode (asterisk) and Local Mode (no asterisk); see "Terms Used In This Manual". The setting is retained in non-volatile memory; the Remote Mode configuration may be specified using the Datacomm Configuration Menu (see Section 5). |
| <SMOOTH SCROLL*> | Activates/deactivates Smooth Scroll. Smooth scroll causes the text to scroll smoothly up/down the screen when using [Shift] [▲] or [Shift] (▼]. |

Continued . . .

<**modes**> labels (continued)

| LABEL | FUNCTION (MODES) |
|---|---|
| <MEMORY LOCK*> | Activates/deactivates Memory Lock. Memory Lock can be used in Overflow Protect Mode or Display Lock Mode.<br>**Overflow Protect** – used to prevent data loss due to memory overflow. Enabled by activating Memory Lock in the first line on the screen. Data can then be added up to the end of the display memory. At the end of the memory, no additional data can be added; if attempted the error message: "MEMORY FULL Press RETURN to clear" is displayed. However, existing data can be modified, provided no new lines (or video enhancements) are created. Overflow Protect Mode is disabled by deactivating Memory Lock.<br>**Display Lock** – used to lock lines of text on the screen (so they do not move using Roll Up/Down and Home Up/Down). Enabled by activating Memory Lock, disabled by deactivating Memory Lock. When Display Lock is enabled, all data between the first line on the screen and the line containing the cursor is locked on the screen. If new lines are added (below locked ones), when the screen is full they are rolled up under the locked lines and placed in the memory above the locked data. Roll Up/Down and Home Up/Down may be used to move the non-locked lines under the locked ones (see Page 2-12 for details). |
| <DISPLAY FUNCTNS*> | Activates/deactivates Display Functions Mode. In this mode, control characters (generated by keys such as [**Return**], [**Tab**], [**Esc**], edit keys) and control code (generated by [**CTRL**] plus a character key) are displayed as symbols on the screen. The terminal does not perform the function indicated by the key. The [**Return**] key, however (when set to generate a Carriage Return character), displays a $\subset_R$ symbol, and causes a carriage return and line feed to be performed. If automatic line feed is on, an $\downarrow_F$ symbol is also displayed. The [**Enter**] key operates "normally". Note that this display functions mode is separate to that available when menus are displayed. |
| <AUTO LF*> | Activates/deactivates automatic line feed. Automatic line feed causes a line feed with every carriage return (see [**Return**] key Section 3). In Remote Mode using Character Mode communications, automatic line feed should be deactivated as the computer normally performs it. |

<**config keys**> Labels


| LABEL | FUNCTION (CONFIGURATION MENUS, see Section 5 for details) |
|---|---|
| <**datacomm config**> | Causes terminal to display the Datacomm Configuration Menu and the screen labels used to control the menu (with cursor in first parameter field). |
| <**ext dev config**> | Label only displayed when terminal equipped with Datacomm module (port 2). Causes terminal to display the External Device Configuration Menu and the labels used to control the menu (with cursor in first parameter field). |
| <**terminal config**> | Causes terminal to display the Terminal Configuration Menu and the labels used to control the menu (with cursor in first parameter field). |

Datacomm/ext dev/terminal Configuration Menu Labels (see Section 5)


| LABEL | FUNCTION (CONFIGURATION MENU CONTROL KEYS, see Section 5 for details) |
|---|---|
| <SAVE CONFIG> | Saves the displayed configuration parameters in the non-volatile memory, and returns terminal to normal operations with SYSTEM labels. |
| <NEXT CHOICE> | Most menu fields have a pre-set list of acceptable settings (some only have two). The <NEXT CHOICE> and <PREVIOUS CHOICE> keys scroll forward/backward through this list. |
| <PREVIOUS CHOICE> | |
| <DEFAULT VALUES> | Sets ALL the parameter fields to their pre-set default values (irrespective of where the cursor is positioned), and moves cursor to first parameter field. |
| <DISPLAY FUNCTNS*> | When cursor is in a parameter field that can have any value, allows control characters to be entered and displayed symbolically in the field. Control characters may be accessed using [CTRL] and the relevant alphabetic key (the edit and page control keys are inhibited). |
| <config keys> | Terminates the configuration mode without saving the entered values, and returns the terminal to normal operations with Configuration Key Menu labels. |

User Function Key Definition Menu Labels (see Section 3)


| LABEL | FUNCTION (USER MENU CONTROL KEYS, see Section 3 for details) |
|---|---|
| <NEXT CHOICE> | When the cursor is in the operating mode field (field "L", "T" or "N"), the <NEXT CHOICE> and <PREVIOUS CHOICE> keys scroll forwards/bachwards through "L", "T" and "N" values. |
| <PREVIOUS CHOICE> | |
| <DEFAULT VALUES> | Sets ALL the parameter fields to their pre-set default values (irrespective of where the cursor is positioned), and moves cursor to first "operating mode" field. |
| <DISPLAY FUNCTNS> | When the cursor is in a parameter field that can have any value (e.g. label or key field), it allows terminal control characters to be entered and displayed symbolically in the field. Control characters can be accessed using [CTRL] and the relevant alphabetic key (the edit and page control keys can also be used). The control operation(s) signified by the control character(s) in the key field is performed when the key is subsequently used. |

# Configuring The Terminal From The Keyboard

SECTION 5

## Contents



## Illustrations

Press **[User System]** key to display the primary SYSTEM labels:

| device control | margins/ tabs/col | service keys | modes | | | | config keys |
|---|---|---|---|---|---|---|---|

Then press key **[f8]** (<**config keys**>) to display main configuration labels

| | | datacomm config | ext dev config | terminal config | | | |
|---|---|---|---|---|---|---|---|
| [f1] | [f2] | [f3] | [f4] | [f5] | [f6] | [f7] | [f8] |

Then press key **[f3]** (<**datacomm config**>) or **[f4]** (<**ext device config**>) or **[f5]** (<**terminal config**>) to display the configuration menu shown in Figure 5-2. <**ext device config**> is only displayed if a Datacomm Module is fitted in port 2.

Figure 5-1. How To Display A Configuration Menu

DATACOMM CONFIGURATION

BaudRate [2400] Parity/DataBits [None/8]
Asterisk [OFF] Chk Parity [NO] SR (CH) [LO] EnqAck [YES]
RecvPace [None] CS (CB) Xmit [NO]
XmitPace [None]

Note: With current loop datacomm module, parameter "CS (CB) Xmit" should be set to "NO".

OR

EXTERNAL DEVICE CONFIGURATION

BaudRate [2400] Parity/DataBits [None/8] PrinterNulls [000]
PrinterType [ROMAN 8] SRRXmit [NO]
XmitPace [None] SRRInvert [NO] CS (CB) Xmit [NO]

Note: Menu only available if terminal has second port (i.e. port 2 fitted with Datacomm module). Also with parallel datacomm module, parameters "SRRXmit" and "CS (CB) Xmit" should be set to "NO".

OR

TERMINAL CONFIGURATION

Datacomm/ExtDev [PORT1/PORT2] Keyboard [USASCII]
TerminalId [2392A] Language [ENGLISH]
LocalEcho [OFF] CapsLock [OFF] StartCol [01] Bell [ON]
XmitFnctn (A) [NO] SPOW (B) [NO] InhEolWrp (C) [NO] Line/Page (D) [LINE]
InhHndShk (G) [NO] Inh DC2 (H) [NO] EscXfer (N) [NO]
FldSeparator [$_{US}$] BlkTerminator [$_{RS}$] ReturnDef [$_{CR}$]

Note: "Datacomm/ExtDev" is only displayed when the terminal is equipped with a second port. "CapsLock" only affects USASCII keyboard (ignored by terminal with national keyboard).

Datacomm/device/terminal configuration menu labels

| SAVE CONFIG | NEXT CHOICE | PREVIOUS CHOICE | DEFAULT VALUES | | | DISPLAY FUNCTNS | config keys |
|---|---|---|---|---|---|---|---|

Figure 5-2. Datacomm/Device/Terminal Configuration Menus (default values)

# Configuring The Terminal From The Keyboard

SECTION 5

## INTRODUCTION

For the terminal to operate correctly, the relevant operating characteristics must be configured. Similarly, for the terminal to correctly communicate with a device, the terminal-to-device communication parameters must be configured; that is, both the terminal and the device must "speak the same language".

## HOW TO CONFIGURE THE TERMINAL

The terminal is configured from the keyboard using a configuration menu. This is a list of configurable parameters displayed on the screen which can be modified from the keyboard. Three menus are available (see Figure 5-2):

- Datacomm configuration menu – used to select the terminal-to-computer communication characteristics. Most of the parameters must conform to a fixed system-defined list of values.
- External device configuration menu – used to select the terminal-to-device communication characteristics. For most devices (such as printers), the parameters are not fixed and can be set to any value, provided they are the same on both the terminal and the device.
- Terminal configuration menu – used to select the terminal's operating modes/characteristics. For example, the keyboard used must be selected for the correct characters to be generated, and the port assignment must be correctly set to allow the terminal to communicate with a computer/device.

The User Function Key Definition Menu is described in Section 3.

### Using The Configuration Menus

For most applications, you will find that the terminal's default parameters may be used. However, if you need to change a parameter, simply display the relevant menu (as shown in Figure 5-1), then place the cursor in the relevant parameter field (displayed in half-bright inverse video) using the cursor control or **[Tab]** key (the cursor is displayed in full-bright inverse video in the parameter fields, and in "normal" video outside the fields). Make the desired change using:

1) The configuration menu labels <**NEXT CHOICE**> and <**PREVIOUS CHOICE**> for parameters that take a value from a pre-defined list (such as Baud rate). These parameter fields have an underline.
2) The keyboard's alphanumeric keys for parameters that can have any value; e.g. parameters where any character can be specified (such as the Fld Separator, Blk Terminator and Return default). These parameter fields have NO underline. For these parameters only, the configuration menu label <**DISPLAY FUNCTIONS**> allows terminal control characters to be entered (and displayed symbolically). The control characters may be accessed using **[CTRL]** and the relevant alphabetic key (see the Reference Manual).

NOTE

When a configuration menu is displayed, the page control and edit keys are inhibited. In addition, all the keys operate "locally" (except **[Stop]** and **[Reset Break]** which operate "normally"). This is because no data is transmitted to the computer. Data (including Escape sequences) received from the computer is stored in the terminal's buffer and not executed until the menu is exited.

3) The configuration menu label <**DEFAULT VALUES**> to return ALL the parameters to their pre-defined default values (irrespective the cursor's position), and moves the cursor to the first parameter field.

To return to the main configuration labels WITHOUT saving the changes, press key **[f8]** <**config keys**> (the previous values are retained).

To save the new values (and put them into effect), press key **[f1]** (<**SAVE CONFIG**>). This automatically causes the SYSTEM labels to be displayed (and the terminal to return to normal operations). The values defined from the keyboard are stored in the terminal's non-volatile memory and are saved when the terminal is switched OFF then ON.

The parameter values may also be changed from the host computer. These values are displayed in the menu but are not saved in non-volatile memory. The terminal reverts to the previously saved (power-on) values when it is switched OFF or a hard reset occurs. See the Reference Manual for further information on configuration menu terminology and settings.

NOTE

If the terminal is equipped with a parallel port (option 093), this port can only be used with a printer. Displaying the Terminal Configuration Menu and attempting to use the "Datacomm/Ext/Dev" field to set this port for the computer, displays the error message "Function locked Press RETURN to clear".

## Printing Screen Menus

If required, the menu displayed on the screen can be printed on an external device using the **[Print Enter]** key, see Section 3 for details.

# In Case Of Difficulty — SECTION 6

## Contents



## Tables

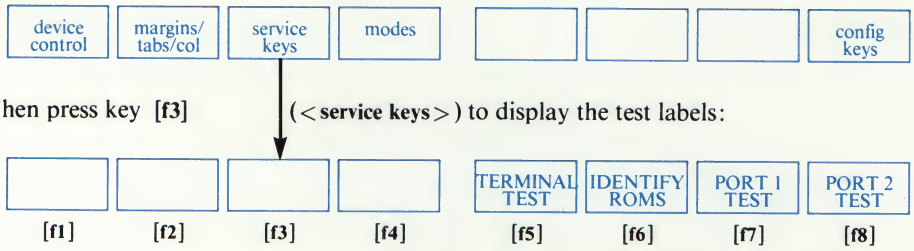


## Illustrations

Table 6-1. Terminal Error Messages

| ERROR MESSAGE | MEANING |
|---|---|
| Default configs used<br>Press RETURN to clear | Non-volatile memory reset. Battery may have jarred loose. Check batteries and battery support. |
| No "TO" device<br>Press RETURN to clear | You attempted to perform a terminal-to-device or computer-to-device data transfer without having first defined the "to" device (see Page 2-21). |
| Source = destination<br>Press RETURN to clear | You have defined the same device (e.g. display) as the "from" device and "to" device when copying data. The display is automatically the "from" device (see Page 2-22). |
| MEMORY FULL<br>Press RETURN to clear | Memory Lock mode set to overflow protect, and memory now full (see Page 2-11). |
| Function locked<br>Press RETURN to clear | The function you attempted to use has been disabled. i.e. attempting to set a parallel printer port as the computer port, or attempting to access a configuration menu locked-out programmatically. |

Press [**User System**] key to display the SYSTEM labels:




<**PORT 2 TEST**> only displayed if terminal has second port

Press key [f5] (<**TERMINAL TEST**>) or [f6] (<**IDENTIFY ROMS**>) or [f7] (<**PORT 1 TEST**>) or [f8] (<**PORT 2 TEST**>) to select desired test. Port 1 and port 2 require test connectors to perform the port test.

[**Shift**] with [f5] or [f7] or [f8] starts a continuous test (with asterisk in label) which can be stopped by pressing relevant [f5], [f7] or [f8] key again (when test labels are displayed).

| Using label | Message | Meaning |
|---|---|---|
| Any test label | TESTING! | Terminal performing specified test (lasts about two seconds). |
| <**TERMINAL TEST**> | Test pattern | Test OK (see page 6-4). |
| | RAM ERROR #<br>Press RETURN to clear | Error found in specified Random Access Memory (# 1 to # 4). |
| | ROM ERROR #<br>Press RETURN to clear | Error found in specified Read Only Memory (# 1 or # 2). |
| <**IDENTIFY ROMS**> | Firmware ROMs<br>---------- | List of part numbers of terminal ROMs (the current firmware revision). |
| <**PORT 1 TEST**> and also <**PORT 2 TEST**>) | PORT 1 ERROR #<br>(or PORT 2 ERROR #)<br>Press RETURN to clear | Error found in port, where error code specifies error (see service manual)<br>e.g. ERROR # 1 = no test connector. |

Figure 6-1. How To Use The Self-test Labels

# In Case Of Difficulty — SECTION 6

## INTRODUCTION

If the terminal doesn't do what you expect it to do or displays an error message (in place of the labels), check its operation as described below. When an error message is displayed, the keyboard is locked out. Note that when the keyboard is locked, normally only keys [**CTRL**], [**Shift**] and [**Reset Break**] function, but if an error message is displayed the [**Return**] key also functions.

## IF THE TERMINAL DOES NOT OPERATE CORRECTLY

**Power-on failure.** If the terminal does not power-on correctly (as described in Section 2 and later in this section), switch it OFF then ensure:

1) The power cable is properly attached.
2) The terminal is set for the site voltage (the required voltage is marked on the rear of the terminal), and the site power outlet is operating correctly.
3) The keyboard cable is correctly fitted.

Switch ON the terminal (ensure the brightness control is correctly set, see Figure 4-1). If the failure is repeated, contact your local HP office.

**Screen label failure.** If the screen labels are not displayed they may have been switched OFF. Press the [**Menu**] key once to switch them ON.

If the screen labels displayed when the [**User System**] key is pressed appear to contain garbled data, ensure the Language parameter in the Terminal Configuration Menu is correctly set (see Section 5). The user definable labels (displayed by pressing [**Menu**] twice, or pressing [**Shift**] with [**User System**], or pressing [**CTRL**] with [**User System**] ) may be altered as described in Section 3.

If pressing keys [**Menu**], or [**User System**], or label <**modes**> causes the terminal to beep (and existing labels to remain displayed), these keys have been locked programmatically.

**Entered data error.** If the character displayed on the screen when a key is pressed does not correspond to that shown on the keycap, ensure the "Keyboard" parameter in the Terminal Configuration Menu is correctly set (see Section 5).

### Typical Errors

#### Local Mode Errors

1) If entered characters are not displayed, the keyboard may have been accidently locked out. Simultaneously press keys [**Shift**] and [**Reset Break**] to perform a soft reset (see Section 3). Alternatively, the terminal may be set to the Remote Mode; you can change the setting to Local Mode following the procedure described on Page 2-7.

2) If data cannot be transferred to the external printer, ensure that the terminal and printer are correctly configured, and <**TO EXT DEV***> is set ON in the device control labels (see Section 5). Also check the printer cable connection, and ensure the printer is switched ON and set to ON-LINE (or REMOTE).

**Remote Mode Errors**

If you have problems with the terminal's connection to the host computer, contact your EDP department.

You can clear terminal errors by resetting the terminal using keys **[Shift]** and **[Reset Break]**. Use the **[Reset Break]** key with caution, as it may cause loss of data and/or loss of terminal configuration settings (see Section 3). Typical errors you may encounter include:

1) Entered characters not being displayed:
   a) The keyboard may be locked (the message "KB Lockd" appears on the Status Line). See Section 4 for a list of the conditions that may cause the keyboard to be locked.
   b) The terminal is set to Record Mode (see Page 2-15).
   c) The computer not echoing data. If required, the terminal's Local Echo may be enabled (see Section 5).
   d) The computer is still processing previously entered data or has an error.
2) If a data transfer from the computer stops half way, ensure the **[Stop]** key has not been pressed (the message "STOP" appears in the Status Line). Otherwise the fault may be due to a computer error.
3) If the DEL character "■" appears on the screen, data may have been lost due to an error in communications between the terminal and the host computer (in which case contact your EDP department).
4) If data cannot be transferred to the computer, ensure that the terminal is correctly configured (see Page 2-13). Also check that the data cable is firmly attached. Contact your EDP department if the malfunction continues.

## ERROR MESSAGES

See Table 6-1 for a list of the terminal error messages. When an error message is displayed, the terminal ignores the requested action and the keyboard is locked until **[Return]** or **[Shift]** **[Reset Break]** is pressed.

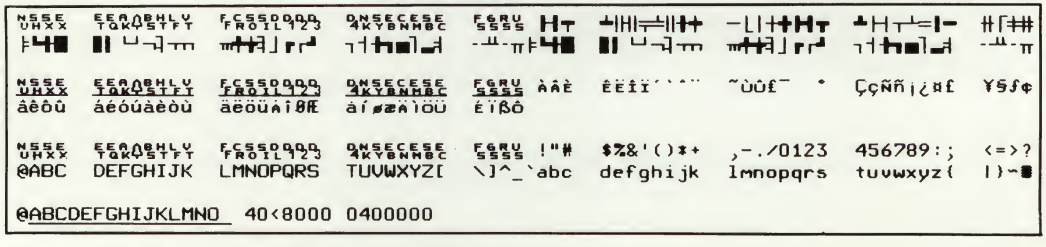



Figure 6-2. Terminal Test Pattern (Typical)

## TERMINAL SELF-TESTS

Figure 6-1 details the self-tests (ports can only be tested when equipped with appropriate test connectors, and following the procedures described in the service manual). If the terminal is operating correctly, pressing <**TERMINAL TEST**> displays the test pattern shown in Figure 6-2.

## TERMINAL POWER-ON STATE

At power-on the terminal beeps. After approximately 10 seconds (when the terminal has successfully performed its power-on self test) the terminal beeps again. The terminal is then set as follows:

1) The cursor is displayed at the top left-hand corner of the screen (column 1, line 1), and the display memory is cleared.
2) The eight labels associated with the MODES function are displayed at the bottom of the screen.
   a) Four operating controls associated with the MODES function are inactive (no asterisk in label): LINE MODIFY, SMOOTH SCROLLING, MEMORY LOCK and DISPLAY FUNCTIONS.
   b) The remaining four MODES operating controls (MODIFY ALL, BLOCK MODE, REMOTE MODE and AUTO LF), plus the parameters set using the terminal's configuration menu, are set as you configured them before powering OFF (these parameters are stored in non-volatile memory).
3) The Status Line symbol "*" is displayed if the terminal is connected to the computer via an operational modem.
4) Certain keys and parameters are reset as follows:
   a) The keyboard is unlocked.
   b) The **[Caps]** key is inactive (set to lower-case). With USASCII keyboards, the terminal may still generate upper-case characters if the Terminal Configuration Menu's CAPS LOCK feature is ON.
   c) The User Keys retain the definitions given to them before powering off.
   d) The left margin is column 1.
   e) The right margin is column 80.
   f) Tab stop is column 1.
   g) The "insert character" edit function is switched OFF.
   h) The Record Mode is switched OFF (this stops the terminal from automatically sending data to an external device).
   i) Stops top/bottom logging, Line Modify Mode, Smooth Scroll and Memory Lock.

## TERMINAL MAINTENANCE

Periodically clean the terminal and change the batteries.

**CAUTION**

1) Do NOT spray water directly into the keyboard, terminal or connectors.
2) Do NOT use petroleum-based cleaners, or cleaners containing acetone, ammonia, benzene or trichlorethylene as they may damage the terminal.

## Cleaning

Dust the keyboard, terminal and screen with a lint-free cloth or paper towel lightly moistened with warm soapy water. Avoid wiping dust into the display unit ventilation slots and keyboard.

## Battery Replacement

Two batteries are located in a battery support at the rear of the display unit. They are used to power the terminal's memory that stores configuration menu settings and user function key definitions. The batteries should be replaced every 12 months. The battery type is Union Carbide Eveready E90 or Duracell MN 9100 (HP part number 1420-0255).

To avoid losing the terminal's configuration settings if the terminal is accidentally switched OFF while the batteries are removed, make a written record of the current settings or print them on the external device (see Section 5 for details).

Replace the batteries as follows:

1) If the terminal is switched OFF, turn it ON and wait until it is ready for use. This prevents configuration menu selections from being lost.
2) Squeeze the tabs on either side of the battery support (see Figure 6-3) so they disengage from the terminal, and simultaneously pull outwards to release the support.
3) Remove the old batteries from the support.
4) Insert the new batteries in the support, ensure the "+" and "–" on the battery correspond with the "+" and "–" on the support.
5) Replace the support in the terminal, the shape of the support ensures it can only be inserted when correctly positioned. Check that the support tabs are correctly engaged with the terminal.

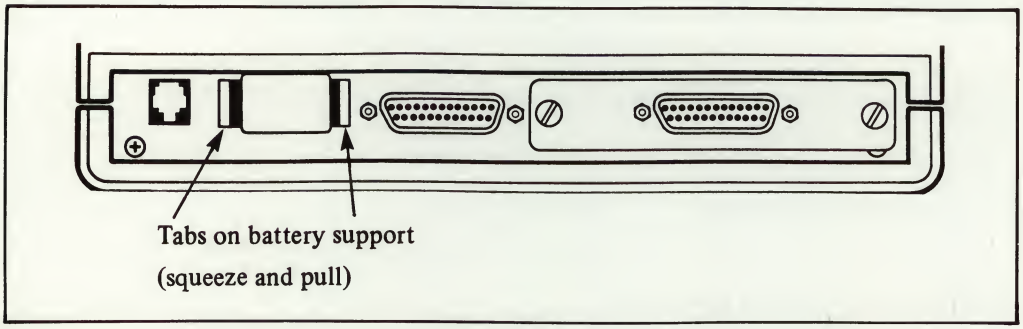



Figure 6-3. Battery Support (rear of display unit)

# Index

## SUMMARY OF HP PARAMETERIZED ESCAPE SEQUENCES

### Terminal Control Functions

| | |
|---|---|
| Esc0 | Home up and copy all memory to external device |
| Esc1 | Set tab |
| Esc2 | Clear tab |
| Esc3 | Clear all tabs |
| Esc4 | Set left margin |
| Esc5 | Set right margin |
| Esc9 | Clear all margins |
| Esc@ | Delay one second |
| EscA | Cursor up |
| EscB | Cursor down |
| EscC | Cursor right |
| EscD | Cursor left |
| EscE | Hard reset |
| EscF | Cursor home down |
| EscG | Move cursor to left margin |
| EscH | Cursor home up |
| EscI | Horizontal tab |
| EscJ | Clear display from cursor to end of memory |
| EscK | Clear line from cursor to end of line |
| EscL | Insert line |
| EscM | Delete line |
| EscP | Delete character |
| EscQ | Start insert mode |
| EscR | End insert mode |
| EscS | Roll up |
| EscT | Roll down |
| EscU | Next page |
| EscV | Previous page |
| EscW | Format mode ON |
| EscX | Format mode OFF |
| EscY | Display function mode ON |
| EscZ | Display function mode OFF |
| Esc[ | Start unprotected field |
| Esc] | Stop unprotected field |
| Esc{ | Converted to Esc[ |
| Esc^ | Primary status request |
| Esc` | Sense cursor relative position (on screen). Returns "Esc&a" sequence |

| | |
|---|---|
| Esca | Sense cursor absolute position in memory. Returns "Esc&a" sequence |
| Escb | Unlock keyboard |
| Escc | Lock keyboard |
| Escd | Transmit a block to the computer |
| Escf | Modem disconnect |
| Escg | Soft reset |
| Esch | Cursor home up |
| Esci | Back tab |
| Escj | Begin user key definition mode |
| Esck | End user key definition mode and display user key labels |
| Escl | Begin memory lock mode |
| Escm | End memory lock mode |
| Escp/w | Default definition for user keys |
| Escz | Initiate terminal self test |
| Esc~ | Secondary terminal status request |

## Cursor Control Operations ("Esc&a" Family)

(Columns and lines start with 0 as leftmost column and top line)

Esc&a<col>c<line>Y — Move cursor to column <col> (1-80) and line <line> (1-24) on screen (Screen relative addressing)

Esc&a<col>c<line>R — Move cursor to column <col> and line <line> in memory (Memory absolute addressing). Rolls text, if necessary

Esc&a+/-<col>c+/-<line>Y Offset cursor on screen by <col> columns and <line> lines from present position (Screen relative addressing)

Esc&a+/-<col>c+/-<line>R Offset cursor in memory by <col> columns and <line> lines from present position (Memory absolute addressing)

## Display Enhancement Operations

Esc&d<CHAR> select the display enhancement indicated by <CHAR>

Esc&ds<CHAR> enables both security field and other selected enhancement(s).

Display Enhancement Character

| Enhancement | <CHAR> @ A B C D E F G H I J K L M N O S |
|---|---|
| Half-bright | H I J K L M N O |
| Underline | D E F G L M N O |
| Inverse video | B C F G J K N O |
| Blinking | A C E G I K M O |
| Security field | S |
| End enhancement | @ |

## Function Key Definition ("Esc&f" family)

| | User keys programming | Default |
|---|---|---|
| Esc&f <attribute>a | Attribute: 0 = N, 1 = L, 2 = T | 0 |
| <key>k | Key: 1 = [f1] to 8 = [f8] | 1 |
| <label length>d | No. of chars in label: 0 to 16 (32 diacritical combinations) | 0 |
| <string length>L | No. of chars in string: 0 to 80 (160 diacritical combinations) | 1 |
| <label><string> | -1 clears string | |

Esc&f<key>E Trigger the execution of the <key>: -1 = [**Enter**], 1 = [**f1**] to 8 = [**f8**]

## Label/Function Key Operation ("Esc&j" family)

Esc&j@ Remove screen labels, and enable user function keys

Esc&jA Display the modes set of labels

Esc&jB Enable the user function keys (the user keys labels are displayed)

Esc&jC Clear <message> and restore current screen labels

Esc&jS Disable function control keys [**User System**] and [**Menu**] and label <**modes**> (if used, terminal beeps)

Esc&jR Enable function control keys [**User System**] and [**Menu**] and label <**modes**>

Esc&j <message length> L <message> Replace the function keys definition by a <message>. <message length> : 0 to 160 (320 diacritical combinations). Terminal beeps at end of displayed <message>. Labels restored by "Esc&jC" or pressing [**Return**].

## Data Operations ("Esc&p" family) – ignored if no second port

Esc&p[<x>d]<x>D — Selects device <x> as the destination device (displays an "*" in selected "to" device screen label and turns off previous "to" device): x=3 display, x=4 external device and [<x>d] = optional.

For the following sequences, if "<x>d" (destination) parameter is not specified, the selected "to" devices in the screen labels are assumed to be the destinations.

Esc&p4d<Y> — Copy "<Y>" amount of data to external device ("4 d").
- Y=B: Copy the line where the cursor is located
- Y=F: Copy the display screen from the line in which the cursor is located to the last displayed line.
- Y=M: Copy the contents of the display memory from the cursor to the end of the memory.

Esc&p<a>d<b>dW<data string> — Transfers the ASCII data string from the computer to the selected "TO" device. The string is terminated either by the 256th byte or by an ASCII line feed. Where, <a> and <b>: 3 = display, 4 = external device.

Esc&p<a>d<b>d<x>W<data string> — Transfers "<x>" bytes of the data string from the computer to the selected "TO" device in binary form. Where, <a> and <b>: 3 = display, 4 = external device.

Esc&p<x>p<y>u<z>C — Performs the action specified by "<z>" on device "<y>" as shown below.

| <z> | ACTION |
|---|---|
| 0 | Generate one form feed |
| 1 | Space number of lines set by parameter "<x>" |
| 2-10 | Generates one form feed |
| 11 | Turn on Log bottom mode |
| 12 | Turn on Log Top mode |
| 13 | Turn off any logging mode |
| 14-19 | Ignored |
| 20 | Turn on Record Mode |

| <y> | DEVICE |
|---|---|
| 4 | External device |
| 3 | Display |

| <x> | OPTIONAL PARAMETER |
|---|---|
| | Optional parameter to define the character to turn OFF Record Mode. Or it may be used in conjunction with 1C (parameter <z>) to specify the number of lines to advance. |

## Configuration ("Esc&q") – saved in non-volatile memory

Esc&q<x>L — <x> value
- 0= Unlock all configuration menus
- 1= Lock all configuration menus; plus functions <**MODIFY ALL**>, <**BLOCK MODE**>, <**REMOTE MODE**> and <**AUTO LF**> (if used error message displayed: "Function locked Press RETURN to clear").

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